Housing Infrastructure Fund – Forward Fund

Impact Evaluation Scoping Report

Contents

FOREWORD

The Housing Infrastructure Fund is an integral part of a range of measures put in place by the Ministry of Housing, Communities and Local Government (MHCLG) to facilitate increased housing supply. Central to the Fund is the provision of infrastructure to unlock new housing sites.

The department is committed to rigorously evaluating its housing supply interventions and this report and an accompanying report set out recommendations for both a process and an impact evaluation. They set out a methodology for assessing the effectiveness and impact of the Fund over the lifecycle of the projects it is supporting in order to learn lessons for future interventions.

The report on plans for the process evaluation draws on an in depth review of the Fund including its design and implementation. It provides recommendations for evaluating the fund in four stages starting with the initial expression of interest stage (where bids were shortlisted for further development, before full business cases were brought forward for consideration for funding), then moving onto to delivery post-approval to the spend of grant funding and the delivery of infrastructure and housing outputs. The process evaluation will provide implementation and delivery lessons for future policy making.

The impact report sets out the methods for testing how many additional homes will result from the Fund (the key objective) as well as wider impacts such as transport improvements. It includes a review of existing data sources and a monitoring framework that will supply the data required to undertake the impact evaluation. Using this framework, the department and Homes England will also be able to monitor the extent to which projects are delivering housing and infrastructure as expected and the overall level of public sector expenditure drawn.

We are very grateful to all those who fed into the design of the evaluation, particularly the Technical Advisory Group (Ed Ferrari – Sheffield Hallam University, Robert Rutherford – BEIS, Dave Gillet and Charles Levy - DfT, and Chris Wilkinson and Joe McTigue - Homes England) that supported the department and Homes England in developing these approaches.

I would also like to extend my thanks to all those who gave their time to be interviewed by our researchers including many colleagues at DfT, MHCLG, and Homes England, and to the researchers at IFF Research and Belmana who led these reports.

Finally, I would like to extend my thanks to the MHCLG team leading this research, including Winona Shaw, Sophie Walsh, Adam Johnson, and Gayle Springett.

We look forward to taking forward the process and impact evaluations with our partners at Homes England and learning from the insights they will provide.

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HIF Impact Evaluation Scoping Review Glossary

Acronyms:

MHCLG – Ministry of Housing, Communities and Local Government
HIF – Housing Infrastructure Fund
FF – Forward Funding
MVF – Marginal Viability Funding
LA – Local authority
TOC – Theory of Change
SMEs – Small and medium-sized enterprises
EOI – Expression of Interest
M&E – Monitoring and evaluation
DfT – Department for Transport
HMT – Her Majesty's Treasury
EF – Evaluation framework
IPA – Infrastructure Projects Authority
HE – Homes England
OGDs – Other government departments
DfE – Department for Education
DEFRA – Department for Environment, Food and Rural Affairs
HoT – Heads of Terms
HMG – Her Majesty's Government
ITT – Invitation to Tender
PMs – Project Managers
SRO – Senior Responsible Owner
MI – Management Information
RCT – Randomised control trial
SMS - Scientific Maryland Scale
ONS – Office for National Statistics
TAG – Transport analysis guidance
EF – Evaluation Framework
PT – Public transport
CIL – Community Infrastructure Levy
NGO – Non-governmental organisation
PPD – Price Paid Data
LSOA – Lower Layer Super Output Area
HtB – Help to Buy
GLA – Greater London Authority
TEMPRO – Trip End Model Presentation Program
NTM – Neural Topic Model
EPC – Energy Performance Certificate
HCM – Housing Completions Model
NHBC – National House Building Council
RMS - Regulated Mortgage Survey
VFM – Value for money

1. Introduction to the Housing Infrastructure Fund

HIF Context

There is a pressing need to increase housing supply in England. The supply of new housing has failed to match household growth as well as pent-up demand for housing that has built up over the years. In response to this problem, the government has introduced a range of measures to reform the housing market and support the deliverability of new and additional housing supply, including, for example and not limited to, the provision of loan finance via the Home Building Fund to target new lending to SMEs, funding through the Affordable Housing Programme, and through revisions to the National Planning Policy Framework, which sets out the Government's planning policies for England. In more recent measures, the government has launched a consultation on Planning for the Future, which sets out proposals for reforming the planning system to become more efficient, effective, and equitable As part of a wide package of measures to increase the rate of housebuilding, one of the priorities is to support the development of infrastructure that enables new homes in areas of greatest housing demand.

Overview of HIF

To facilitate housing in this way, the Housing Infrastructure Fund (HIF) was announced in July 2017, and available funding later increased to a total of £5.5 billion. HIF is a capital grant programme which aims to unlock new housing in areas of high demand, through the provision of infrastructure which, due to some form of market failure, would not come forward without the funding.

HIF is split into two strands, Marginal Viability Funding (MVF) and Forward Funding (FF). MVF is targeted at smaller projects, and the unlocking of housing in the shorter term, providing the final piece of infrastructure to unblock an existing project or allocate additional sites. Forward Funding is targeted at large, strategic and high-impact infrastructure projects that will unlock new homes in the medium and longer term. The funding awarded is likely to be a significant proportion of the upfront infrastructure costs, and may be the first step towards securing private investment. The evaluation will focus on FF as it is the large majority of the fund and MVF is already being considered as part of HE's Evaluation Strategy.

Eligibility for the Forward Fund

The FF was made available to Local Authorities on a competitive basis. To be eligible for FF, bids were expected to be from the uppermost tier of local authorities (including unitary and combined authorities) in England, to ensure they are well placed to be responsible for planning infrastructure requirements and delivery at a strategic scale. FF bids had a soft cap at £250 million under the assumption that this funding contribution will provide the confidence needed to attract other sources of investment. Bidders had to demonstrate that the schemes could not happen without the financial support of this fund.

Stages of the FF bidding process

The FF used a multi-phase, cross-government bidding process to identify the final awards. An initial Expression of Interest (EOI) phase was used to determine breadth of interest and isolate the most promising potential projects, followed by a co-development phase in which prospective bidders were provided expert mentorship and financial support to develop the full business case for their proposed project. Final bids were assessed by MHCLG and Homes England based on their strategic approach, value for money and deliverability, with assessment involving collaboration with other key departments.

HIF FF Objectives

HIF FF aims to work in consonance with the Government's measures to reform the housing market. The key objectives of FF were to:

- Deliver infrastructure with the potential to unlock up to **450,000 homes:** supporting Local Authorities to set up their plans for growth, releasing more land for housing and getting homes built at pace and scale.

- Enable new development where there is demand by offering a co-ordinated approach to funding infrastructure to:

  o **unlock new housing in the short term**, and

  o support new **strategic projects** which deliver additional houses in the long term.

- Ensure the best large scale and ambitious ideas are successful through an innovative **co-development approach**, bringing Local Authorities, central Government, and delivery partners together to develop business cases.

Current Status[1]

The FF represents the vast majority of the total HIF funding. In total, 34 projects were selected to receive funding, which ranges from £12.9 million to £280 million (outturn prices). 3 projects have subsequently withdrawn, and therefore there are 31 currently in progress. All except one is expected to be in contract with Homes England by the end of March 2021. The majority of FF projects are expected to deliver on infrastructure spend by 2025. However, the housing outcomes and impacts from this are expected to be delivered up to and beyond 2040.

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[1] As reported on Gov.UK: https://www.gov.uk/government/publications/housing-infrastructure-fund

2. Research Objectives and Methodology

Purpose and objectives of this study

The Ministry of Housing, Communities and Local Government (MHCLG) commissioned IFF Research and Belmana Ltd. to conduct an evaluation scoping study for the HIF - Forward Fund (FF), prior to commissioning a full evaluation. As noted earlier, evaluation plans for the MVF were excluded from this study.

The aim of the FF scoping study was to develop detailed proposals for the monitoring and evaluation of the Fund, needed to provide evidence about the effectiveness and value for money of the FF in achieving its objectives. Evaluation approaches were expected to deliver two crucial forms of evidence: formative evidence about the delivery of the programme to understand the effectiveness of delivery mechanisms (process evaluation); and summative evidence demonstrating the FF's delivery on its intended outcomes and impact for both its housing and infrastructure objectives (impact evaluation).

The scoping study will result in recommended feasible, costed designs for both process and impact evaluations, including recommended metrics and indicators required for both national and local evaluations and provision of guidance to implement these evaluations successfully at the local and central government levels. MHCLG specified the following deliverables as required outputs of the scoping study:

- Development of a Theory of Change for the Housing Infrastructure Fund, which takes into account the complexity and differing objectives of HIF FF projects (i.e. housing vs infrastructure objectives, with housing objectives expected to be the majority).
- Creation of a Central Monitoring Framework articulating the data requirements for robust evaluation across various owners (MHCLG and its agencies, other government departments and an external evaluator), at different points in time and likely from an array of sources (primary or secondary).
- Creation of a Local Monitoring and Evaluation Framework that provides clear guidance on what Fund recipients (Local Authorities) will need to do and deliver for evaluation purposes.
- Delivery of two Evaluation Scoping Reports – one for a Process Evaluation and a second for an Impact Evaluation – that lay out detailed recommendations on the evaluation of the FF, considering a range of approaches, the feasibility of each, the potential for a counterfactual, and must include cost and timetable options for each. The emphasis across all elements the proposed evaluation approaches are expected to assign monitoring and evaluation (M&E) activities to the most effective 'owner' (level) with an emphasis on minimising burden across the evaluation, but particularly for Local Authorities.
- To facilitate the above, a detailed review of HIF documentation (including the preliminary scoping work completed by MHCLG and the What Works Centre for Local Economic Growth) and inclusion of minimum six interviews with policymakers to support the process evaluation design.

Ultimately, the scoping study was expected to set out the monitoring and evaluation requirements needed to identify and evidence the effectiveness and value of money of FF

in achieving its overall housing policy objectives through a combination of infrastructure and housing activity.

Methodology

In partnership with Belmana Ltd, IFF Research led the delivery of the scoping study across six phases of work, each detailed below.

Phase 1: Document Review & Stakeholder Interviews

Following the project's inception, the first phase of work involved an extensive document review complemented by stakeholder interviews to develop a clear and detailed understanding of HIF overall, the FF within this, details of the Fund's objectives, process, and intended outcomes, and its likely evaluation needs.

The document review was followed by stakeholder interviews with key policymakers from MHCLG and other departments vital to understanding the design and execution of the FF, particularly HIF background, process for FF applications, and/or the current state of FF projects. Following consultation with the core MHCLG team, tele-depth interviews were conducted with six individuals from MHCLG, Homes England and the Department for Transport (DfT), each selected based on their experience of the FF and relevance to the scoping study. Interviews lasted one hour and were designed to provide key background on the FF and details needed to develop the theory of change.

Phase 2: Theory of Change and Evaluation Framework

The development of the TOC was an iterative process. Using the baseline information from Phase 1, the team worked in partnership with the MHCLG team to develop the Fund's theory of change (TOC) and associated evaluation framework (EF) to support the design of the impact evaluation.

THEORY OF CHANGE

IFF used the information gathered about HIF and the FF from stakeholder interviews and the document review to first develop a draft logic model. This began with a 'list-based theory of change' after the document review and initial depth interviews outlining the proposed components of the TOC; this stage was used to enable a sense check of and input into the planned design by MHCLG before a full TOC was created, as well as provided an opportunity to reflect on elements that needed greater clarity through the remaining interviews. Following the completion of all Phase 1 stakeholder interviews, this list of components was updated, and a TOC/logic model created, setting out the logic underpinning the FF, in relation to its outputs, outcomes and impacts. Following a first review and amends from the core MHCLG team, a half-day workshop was held with the MHCLG team and key individuals from Homes England, DfT, and the Infrastructure Projects Authority (IPA) as those well placed to refine the design. The workshop worked collaboratively through each element of the TOC to better refine and define the TOC and its elements, as well as work through any issues as a group. Following the workshop, further revisions to the TOC were made and a revised draft shared with the MHCLG team for comment and reviewed by the project's Technical Advisory Group before sign-off. A

near final version was taken forward for the evaluation framework design, with some minor updates during this process to ensure the alignment and completeness of both documents.

EVALUATION FRAMEWORK

A crucial step after the TOC is created and before the evaluation could be precisely designed was the creation of an evaluation framework (EF). The EF provides a roadmap on how the evaluation will deliver on the logic model evaluation needs and forms a crucial first step in designing the evaluation approach, as it organises each indicator that will need to be evaluated (per the TOC), any considerations that will impact this, and determine the best method or methods to deliver results.

The EF was developed as a comprehensive table in Excel using the insight gained in Phase 1 (particularly the data sources already identified in MHCLG's preliminary scoping work) and supplemented with a) the team's existing knowledge of the data landscape in this sector, b) desk research to assess prospective data sources that could support the evaluation via delivery of specific indicators, and c) conversations with data analysts and other experts from MHCLG and DfT on available data sources. Once a partial first draft of the EF was created, this was shared with the MHCLG team for input, which included verifying prospective internal data sources and responding to clarifications related to specific indicators (i.e. confirming definitions, priorities, etc.). The process to develop the final EF included multiple rounds of input by MHCLG, conversations with DfT analysts in relation to viable data sources, and others about the potential value of potential sources for use in this, and discussion across three Technical Advisory Group meetings to ensure their input was taken into account in the design.

During the EF process, the Belmana team began the task of identifying the data and analysis to support delivery of the 'additionality' outcome, as well as how to conduct an appropriate counterfactual based on the available data landscape. This is detailed further in Phase 4 below.

Phase 3: HIF Process Development

In parallel to Phase 2, the team began developing a comparable logic model and evaluation framework for the FF *process*, necessary to design the process evaluation component of the study. This phase involved further interviews to develop a Process Map (similar to a TOC) to visualise the FF's bidding process to the point of award and expected process during the Funded stage, followed by the development of a process EF to identify the necessary indicators to evaluate the FF process. This phase and its outputs are not included in this report but will be the focus of a second report detailing the process evaluation approach.

PROCESS MAP & EVALUATION FRAMEWORK

Development of the process map again utilised insights gained in the Phase 1 document review and interviews, supplemented with further interviews with policymakers to understand the bidding process and expected future delivery process in more detail.

The IFF team conducted 11 in depth interviews via phone with key individuals from different organisations involved in the process, including: the MHCLG policy team, the Homes England central team and a selection of area leads, area leads from DfT, a representative of the IPA, and private economics consultants involved in supporting the bidding Authorities. Interviews lasted one hour and sought detail on each phase of the bidding process (as established in earlier phases), including activities undertaken and their order, people involved, the business case requirements, and further detail on the assessment criteria and process for each phase; this was supplemented, where relevant, with detail on the post-award process to get winning Local Authorities into contract and process plans for FF delivery. Interviews focussed on collecting detail of the process itself, not evaluation of the process.

Following the completion of these interviews, an Excel framework was created to 'map' the process phases, their purpose and the specific activities and involvement of different actors at each point. Due to the complexity of the process (the volume of stages and number of organisations involved), it was decided that a visual map like the TOC would not provide the necessary detail; instead, the Excel-based mapping was used as the main process map, supplemented by a one-slide summary of the process.

Following agreement on the process map, an associated EF was developed to clarify the data requirements and their respective sources for the process evaluation.

Phase 4: Process and Impact Evaluation Design

Once Phases 2 and 3 were complete, the team used the evaluation frameworks to develop evaluation approaches for both the process and impact evaluations. This involved internal design sessions and further conversations with the MHCLG to identify the specific phases of the proposed evaluations, the data collection requirements and necessary methods for each, and suggested timings.

For the impact evaluation, the design emerged naturally through the development of the EF, where the detail on data requirements (and the necessary timings and sources for each) were organised into discrete, achievable and clear phases. From this, the team drafted approaches based on collection and analysis of monitoring data, as well as any secondary research requirements, such as secondary data analysis or qualitative research need.

This phase also considered approaches that can determine the level of housing impacts attributable to HIF FF. Robust estimates of the additional impacts depend on a high-quality counterfactual. This provides an estimate of what would have happened without support. Previous phases highlighted the expected housing impacts, especially additional housing. Through a literature review and discussions, the fourth phase explored the extent to which different counterfactual impact evaluation methods were possible, considering the datasets available, the timing of different housing impacts and what could be learnt from past evaluations.

For the process evaluation, design was split early into two components based on the natural process division of the FF: an initial retrospective evaluation of the bidding and assessment process with all those involved, followed by an in-Fund process evaluation that would need to be ongoing for the life of the FF. Evaluation approaches were then

designed for each phase based on the unique needs and timings of each, again with input from MHCLG.

The final plans for both the impact and process evaluations were agreed with MHCLG before development of the final outputs.

Phase 5: Final Evaluation Approach and Reporting

Once the designs of the process and impact evaluations were agreed, the team then began the design and drafting of the four required outputs of the scoping study: two evaluation reports each outline the recommended approach to evaluation the process and impact of the HIF Forward Fund, to be followed by two 'frameworks' providing detailed instruction and tools for central and local governments to conduct the suggest evaluation. This report focuses on the first of these four deliverables, namely the impact evaluation.

3. Introduction to the Impact Evaluation Report

Impact evaluation: purpose and considerations

Evaluation is an independent, systematic investigation into how, why, and to what extent policy objectives or goals are achieved. It can help answer key questions about the value for money of initiatives, looking at how effective, efficient and sustainable they are. Impact evaluation assesses how much of a policy's impact is additional, measuring achievements meeting policy objectives and, crucially, caused by the policy.

An impact evaluation needs to assess the effects of the policy, which itself can be difficult, but also then attribute this *with confidence* to the policy. A range of impact evaluation methods have been developed to estimate attribution and HMT Magenta Book distinguishes between theory-based approaches, quasi-experimental and experimental approaches and cost benefit methods. Evaluations generally mix these approaches, each seeking to observe the overall effects of a policy but then qualitatively or quantitatively adjust for what cannot be attributed to the policy.

Experimental & quasi-experimental approaches

There are evaluation methods that use a counterfactual in estimating additional impacts. A counterfactual is some comparator that has been constructed to establish what would have happened without the policy. For housing policy, this can provide estimates of any housebuilding that would have taken place in the supported areas without HIF investment (called the deadweight of a policy) and to quantify any reduction in housebuilding elsewhere that could be attributed to the policy (displacement).

Scoping can decide which approaches to use by considering the practicality of a method in terms of the robustness that is attainable. MHCLG's 2019 Housing Monitoring and Evaluation Strategy[2] outlines some of the challenges in evaluating housing policies, deriving from the spatial and area-based nature of housing supply interventions. It particularly notes the challenge of identifying a robust counterfactual and, to support designing an impact evaluation approach, the What Works Centre scales approaches using five levels, broadly in line with the Scientific Maryland Scale (SMS) of 1 (low) to 5 (high)[3]. The most robust evaluation approach involves finding comparators using a randomised control trial (RCT) and this is scored at SMS level 5. HIF, like many housing supply policies, is run without randomisation, and so focus turns to methods that seek to use comparators.

There is then a risk that any differential performance after support is due to performance being correlated with selection, called selection bias, making attribution to the intervention less robust unless there is confidence that the comparators are not affected by this. A

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[2] See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/775800/Housing_evaluation _strategy.pdf
[3] See https://whatworksgrowth.org/resources/the-scientific-maryland-scale/#

concern is that there is some feature in the supported projects (such as being located in a prosperous area) that both drives a promoter seeking infrastructure and also has a high demand for housing anyway. This would mean that any support's high impact could be attributed to some underlying advantage and not the fund. Impact evaluation approaches try to determine this underlying selection bias, using a range of quasi experimental methods, i.e. approaches not relying on the randomisation of RCT experiments. The different approaches considered in this scoping exercise are detailed in Appendix 4.

Theory based approaches

Experimental and quasi-experimental approaches are selected with the primary aim of assessing the net impact of an intervention. But this in itself will not produce insights about how any measured change comes about, or whether the same outcome would occur if the intervention is tried in another context or at a different scale. Combining experimental/quasi-experimental approaches with theory-based approaches or supplementing with process evaluation evidence can provide this often-essential insight.

Theory-based impact evaluations draw conclusions about an intervention's impact through rigorous testing of whether the causal chains thought to bring about change are supported by sufficiently strong evidence and that alternative explanations can be ruled out. Theory-based evaluation is explicitly concerned with both the extent of the change and why change occurs; it tries to get inside the black-box of what happens between inputs and outcomes, and how that is affected by wider contexts. Theory-based evaluations are centred on a well-defined Theory of Change, which includes theories about alternative explanations for the outcomes. Once a theory is established, the theory is tested through multiple evidence sources. [4] The Theory of Change for the HIF Forward Fund is discussed further in the next chapter, and the range of relevant theory-based approaches considered are detailed in the Evaluation Approach chapter.

Scope of this evaluation

HIF is an integral part of the Government's plan to reform the housing market and boost the supply of new homes in England. Therefore, the primary focus of the evaluation is the housing outcomes associated with the Fund.

Within that, whilst there are established methodologies for evaluating the impact achieved from investment in infrastructure and for the impact of direct investment in housing supply, there is both an evidence gap and absence of an established approach to estimate the impact of infrastructure funding on achievement of additional housing. As such, the first research question for the impact evaluation is:

- How many homes have been built on HIF FF sites that would not have been built without the infrastructure funded through the scheme (taking into account displacement of housing from other sites)?

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[4] HM Treasury (2020) The Magenta Book

Throughout this report we refer to these homes as 'additional homes'[5], as opposed to the total number of gross homes built on FF sites which are referred to as 'total' or 'overall' homes built.

A second, major area of focus for the impact evaluation are the outcomes resulting from the infrastructure itself. Most HIF FF investments are transport improvements, principally road but also rail investments, such as increasing rail capacity or rail links. Understanding whether the infrastructure has delivered as intended is a measure of Fund impact in itself but, more critically, it also provides an early indication of whether the project(s) will achieve the intended levels of additional housing. For example, a new road may be funded on an FF site to increase the capacity of road access and prevent congestion on other routes leading to the site, thereby allowing more homes to be built on the site. In this example it is important to know firstly whether the road was built as intended in the FF project plans, and secondly whether the new road led to the expected increase in capacity, that would enable the building of additional homes (and also addressing the market failure that led to government funding). On this basis, the second research question is:

- Have the infrastructure improvements been delivered as intended, and have they achieved the expected outcomes associated with infrastructure improvements?

It is also a priority for the evaluation to measure the impact of investment on the local housing market, in and around HIF FF sites. The evaluation will seek to test the assumption that lack of appropriate infrastructure is the key barrier to developers entering the market. It will also explore how the Fund has impacted the housing market, beyond just increasing supply through additional homes. This is expressed in the following research questions:

- For any new homes, what is the associated land value uplift?
- What impacts on the value of existing homes can be attributed to the Fund both positive and negative, as infrastructure and new housing combine?
- Are there additional homes or commercial developments due to the investments beyond the targeted areas, unanticipated in the bid?

It is important to note that the evaluation approach described in this report does not attempt to assess the total socio-economic impact associated with expansion of the housing supply via HIF FF (which is potentially wide-ranging). Rather it will focus more tightly on the intended impact, as expressed within policy and tender documentation. However, there are a small number of wider housing-related outcomes outlined in the logic model which the impact evaluation seeks to measure, discussed below. These outcomes include impacts on the pace at which planned homes are delivered, the creation / expansion of communities, and the quality / affordability of the new homes. These outcomes would not be subject to comparison with a counterfactual.

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[5] This will be identified using counterfactuals and will incorporate gross homes built net of displacement and 'deadweight' (homes expected to be built regardless of the FF funding).

Aims and structure of this report

This report, the Impact Evaluation Scoping Report, is intended to set out a recommended and fully costed recommendation for the optimal design of the impact evaluation based on an assessment of a range of potential research designs and methodologies and providing specific details of the research design and methods proposed.

The remainder of this report delivers the key foundations and recommendations for the impact evaluation across four sections:

Section 4 – Theory of Change: presentation of the HIF Forward Fund's theory of change, including explanation of the logic of the theory, key assumptions and definitions.

Section 5 – Evaluation Framework: following the theory of change, this section will present the evaluation framework for the FF, which details all the necessary metrics and their data sources needed to demonstrate the FF's impact.

Section 6 – Evaluation Approach: outlines the suggested approach to delivering an impact evaluation of the Fund, including when and how to collect all key metrics presented in the evaluation framework across multiple phases.

Section 7 – Evaluation Implementation: provides final practical details in relation to the execution of the proposed evaluation, including a suggested delivery model and projected costs to deliver.

This report will be complemented by the Process Evaluation Scoping Report, Central Monitoring Framework and Local Monitoring and Evaluation Framework, which together provide the full recommendation and implementation support documents to execute a long-term process and impact evaluation of the Fund.

4. Forward Fund Theory of Change

This section presents the Theory of Change (TOC) designed for the HIF FF programme. It includes information about why and how the TOC was created, followed by the finalised TOC and a summary of each element within it.

What is a Theory of Change?

A TOC is a broad representation of how a policy or programme will achieve its intended objectives and impact its beneficiaries. It explains the process of change by outlining causal linkages between elements of a policy or programme, its intended outcomes, and eventual contributions to impacts. TOCs can vary depending on the policy or programme being reflected but usually it would seek to detail the following:

- The situation that the programme is attempting to address or programme rationale;
- The inputs, resources or audiences that are required to facilitate the programme's operation;
- The activities and outputs that comprise programme support;
- The outcomes (short-, medium-, and long-term outcomes resulting from the activities and outputs); and
- The longer-term impact of the programme on the individual, employer and wider society.

For the purposes of this report, we will refer to each of the above components of the TOC (e.g. activities/outputs, outcomes) as its elements.

The TOC developed for the HIF FF includes the causal linkages between elements i.e. how one element feeds into another. When a TOC includes this logic it is sometimes referred to as a logic model. For the purposes of this report we will be using the term TOC to denote both the elements (e.g. activities/outputs, outcomes) included, and logic between them.

Purpose of the TOC

Developing a TOC was a key aim of this scoping project as its own deliverable and to inform the design of the impact evaluation. It has been used to assess how best to evaluate HIF FF by detailing what needs to be measured in order to evidence the success of HIF FF therefore informing the development of an evaluation framework. It is intended that the TOC will also be helpful for those involved in the design and delivery of the fund by helping them to understand their delivery model more clearly, identify any potential gaps or opportunities, identify any changes that need to be made, and understand the causal pathways that should lead to positive outcomes.

The final TOC for the HIF FF is shown below in Figure 4.1. It outlines the background to the HIF FF, as well as the activities, outputs, outcomes and impacts of the Fund. The next section will explain each of the TOC elements in greater detail.

HIF-FF Theory of Change

Figure 4.1: Forward Fund TOC
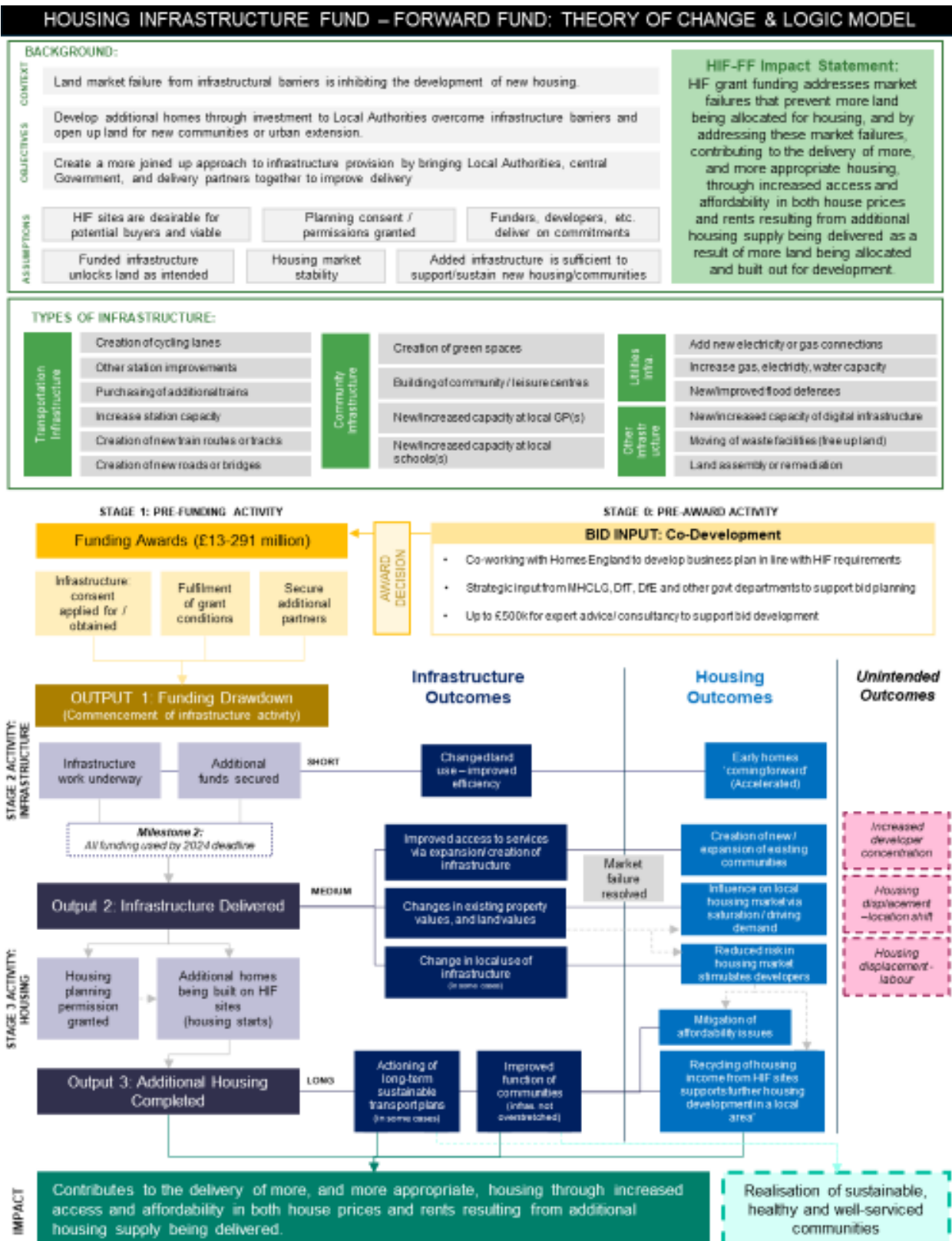
Background

The HIF FF Impact Statement at the top right of the TOC (Figure 4.2) provides a short summary of what the HIF FF is intending to deliver and therefore what an evaluation would seek to measure and test. The context, objectives and assumptions detailed to the left feed into this impact statement and subsequent TOC elements.

Figure 4.1: Background and Impact Statement

The *context* statement provides the rationale for the HIF FF: to address the lack of appropriate infrastructure that is creating land market failure[6] by 'unlocking' land that could otherwise be suitable for new housing.

In light of this market failure, the HIF FF has two main *objectives*: the first details the number of homes HIF FF intends to deliver and the second reflects the desire to improve housing delivery by facilitating a more joined up way of working between relevant parties. The rest of the TOC helps explain how these two objectives will be met.

For the following outcomes and impact shown in the TOC to come to fruition, there are *six circumstances that the Fund assumes* will, and need to, occur:

- *HIF sites are desirable for potential buyers*: it is assumed that all additional homes built via HIF FF are desirable and therefore purchased. If not, then the intended impacts, such as 'increased home ownership' would be impacted.

- *Planning consent/permissions granted*: it is assumed all funded projects will receive the necessary planning permissions required to deliver the required infrastructure.

- It is assumed that all *funders, developers etc. deliver on commitments*

- *Funded infrastructure unlocks land as intended*: it is assumed that by building infrastructure, land can be unlocked, allowing housing development to take place.

- *Housing market stability*: HIF FF forms a relatively small part of a much larger and complex housing market, but it is assumed this market will be sufficiently stable for the intended outputs and outcomes to occur as intended. It is important for the evaluator to take into consideration that the Fund and TOC were designed prior to the COVID-19

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[6] Different types of schemes, and groups of schemes, will address different types of market failure and this should be further clarified by the evaluator upon reviewing all projects

epidemic. The COVID-19 epidemic is likely to have a long-term impact on the UK's housing market, associated industries and the economy in ways that are not yet fully understood or anticipated.

- It is assumed that the infrastructure being funded by HIF FF will be *sufficient to support/sustain new housing/communities*. The amount of additional housing intended to be built through HIF FF may be reduced if the infrastructure does not provide sufficient capacity for new housing developments, for example, transport capacity sufficient.

Types of Infrastructure

This section of the TOC details all the types of transport, community, utilities and other infrastructure that HIF FF was granted funding for[7] (Figure 4.3). The majority of projects submitted and that received HIF FF funding, applied for road or rail (transport) infrastructure.

Figure 4.2: Types of Infrastructure

The TOC has been developed for all types of infrastructure in mind, but it is important to be aware that different infrastructure might impact the specifics of the outcomes and impacts that HIF FF is able to deliver.

Stage 0: Pre-Award Activity

Stage 0 of the TOC summarises the activity that happened before funding was awarded. After an initial Expression of Interest (EOI) stage, viable bids went on to a stage called Co-Development

Figure 4.3: Stage 0 Pre-Award Activity

BID INPUT: Co-Development
• Co-working with Homes England to develop business plan in line with HIF requirements
• Strategic input from MHCLG, DfT, DfE and other govt departments to support bid planning
• Up to £500k for expert advice/ consultancy to support bid development

(Figure 4.4). This stage was a crucial input to the Fund, providing support and funding to help develop strong bids.

Co-Development aimed to help all Local Authorities develop the strongest possible projects (in line with HIF FF objectives) to ensure the strongest ideas went on to be funded. This pre-award activity involved Local Authorities *working directly with Homes England*, as well as receiving *strategic input from MHCLG* and other government departments (depending on the specifics of their bid). Local Authorities could also apply for

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[7] Other types of infrastructure were available for bidding but these are the ones which successful projects included.

distinct funding during this stage to procure **consultant advice** to further support their bid development.

At the end of Co-Development, bids were submitted and assessed, leading to award decisions being made. There are currently 31 bids going forwards with Local Authorities being granted between £13-291 million.

Stage 1: Pre-Funding Activity

Following successful award decision, Stage 1 of the TOC (Figure 4.5) summarises the main three conditions which will need to occur before Local Authorities are able to drawdown their funding and enable infrastructure activity to commence (Output 1).

Figure 4.4: Stage 1 Pre-Funding Activity
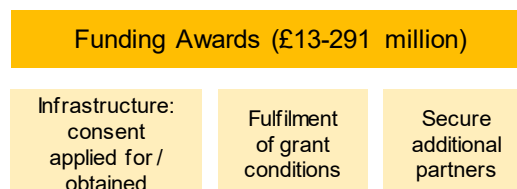
Firstly, planning and all other relevant **consents** will need to be applied and obtained for the different types of infrastructure looking to be built. As explained in the assumptions section, without this consent, it will be impossible for HIF FF to achieve its intended outcomes and impacts.

When Local Authorities are made an award offer, they receive pre-contract conditions and pre-fund conditions (to be met before funding drawdown commences). Therefore, a significant amount of pre-fund activity is Local Authorities fulfilling these required **grant conditions** and HE assessing and confirming this has been done. An example of a pre-contract condition might be for Local Authorities to provide further evidence and information of the procurement route for infrastructure, for example, but conditions are wide ranging and depending on the specifics of the bid. Finally, Local Authorities will seek to **secure any additional partners** that are required for the schemes to go ahead. For example, procurement of companies to build infrastructure.

The amount of time it takes for Local Authorities to complete these pre-funding activities will impact on when funding drawdown will take place and therefore could impact the overall timescales of the schemes. If Local Authorities are not able to complete these pre-funding activities, there would be a risk that funding will never be made available.

Output 1: Funding Drawdown

After required pre-funding activity has occurred and the relevant conditions have been fulfilled, Local Authorities are able to draw funds as needed (Figure 4.6: Output 1). This can be done monthly or quarterly, but within annual spending limits (which have been agreed with HE to ensure budget management). At this point, fund activity and infrastructure build commences from which progress, outcomes and impacts can be monitored.

Figure 4.5: Output 1
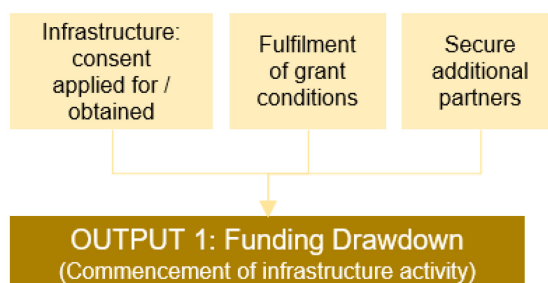
Stage 2 Activity: Infrastructure

Once funding drawdown begins (Output 1), *infrastructure work* should commence. If funding is not received according to expected timelines, then this might impact the progress made on infrastructure work and the associated outcomes (Figure 4.7).

The HIF FF has been designed to help Local Authorities *procure additional funding* and partners needed for their housing development, by providing the initial funding to address market failure. Therefore, for many, the commencement of infrastructure will be dependent on this funding being approved and any delays could impact timescales.

Figure 4.6: Stage 2 Activities and associated infrastructure and housing outcomes
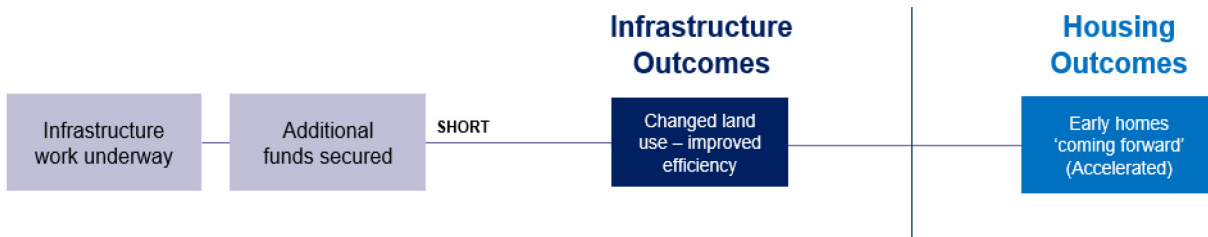
STAGE 2 OUTCOMES
Infrastructure work beginning and additional funding being secured, are expected to lead to two short-term intended outcomes:

- *Infrastructure Outcomes*: With all required funding secured and infrastructure beginning to be built land is expected to change. For instance, the removal of a waste management site would dramatically change that land and make it available for other use.

- *Housing Outcomes:* With funding now secured and construction of infrastructure having begun on site, developers may focus more resource and efforts on completing housing here, meaning 'early homes' will 'come forward' at an accelerated pace.

Milestone 2

Milestone 2 represents the point in the process after Stage 2 activities and associated outcomes have occurred. For the majority of projects[8], all HIF FF funding is required to have been drawdown by the end of 2024. This milestone assumes that all funding has been used and the appropriate progress towards outcomes should therefore be visible.

Figure 4.7: Milestone 2
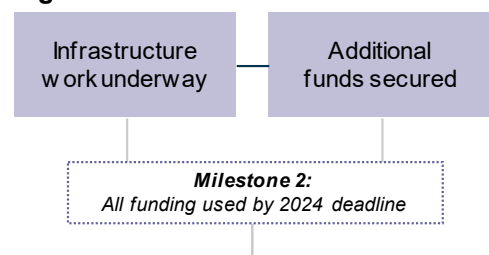
Output 2: Infrastructure Delivered

If pre-funding activity has occurred and all funding has subsequently been drawn down, all HIF funded infrastructure should have been delivered (Figure 4.9: Output 2). The following

Figure 4.8: Output 2

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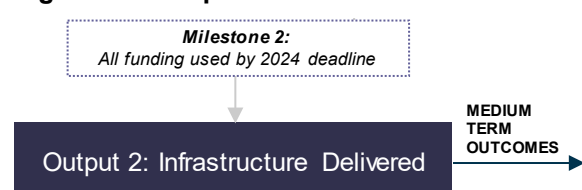
[8] A couple of larger awards have already received an extension to have all funds drawdown by 2027.

intended and unintended medium-term outcomes are based on infrastructure being delivered as well as the scheme costs being in line with the estimates given within the HIF-FF bids and therefore the project remaining viable.

INFRASTRUCTURE OUTCOMES

Improved access to services will be a result of the infrastructure being built, enabling more people to access this infrastructure itself, or accessing other services within the local area as a result of this infrastructure. For example, residents will be able to go to the new GP surgery or use the new road to travel to an existing GP surgery.

Figure 4.9: Output 2 Infrastructure Outcomes

Improved access to services via expansion/ creation of infrastructure

Changes in existing property values, and land values

Change in local use of infrastructure
(in some cases)

Depending on the type of infrastructure built, different *changes in local use of infrastructure* are expected to happen. For example:

o New transport infrastructure may lead to a positive change in travel times for residents. For instance, if train capacity has been increased then residents may be able to commute to and from work at different times. Another change in local use might be an increased choice in modes of transport used for certain journeys.

o A school being built should increase capacity of schools within the area and provide more choice for parents.

o The building of flood defences may result in pre-existing households (within the site's surrounding area) benefiting from reduced risk of flooding.

An *increase in the value of existing housing on and around the HIF FF site* is the final intended outcome expected to occur following infrastructure delivery. Improvements in infrastructure (e.g. more road connections or a new school) are expected to make the area more desirable and help increase its value. An increase in the value of existing housing was not something that was required for HIF FF to be granted to Local Authorities, but is a plausible outcome and therefore important to capture within the TOC and measure within the evaluation.

HOUSING OUTCOMES

Following infrastructure delivery, several medium-term outcomes specific to housing are also expected. Firstly, improved access to services is expected to help **create new, or expand existing, communities**. This refers to the new facilities and amenities beyond housing which are developed on HIF FF sites which contribute to a sense of community e.g. green spaces, schools, commercial activity.

It is unclear what **change in the local housing market** may involve but the building of new infrastructure is unlikely to have zero impact. For example, the demand for housing in the area may increase if it is now being served by improved infrastructure e.g. transport links, amenities, green spaces. Demand for housing displaced from elsewhere could lead to an increase in local house prices. Alternatively, with new homes coming forward, there might be more supply than demand thus decreasing or slowing house price growth. Key to many of the approaches assessing additional impact is using the spatial dimension to this, using the variation as proximity to the investment changes.

Finally, the drawing down of funding and the completion of infrastructure is expected to increase confidence in developers that these sites are worth investing in and ultimately encourage homes to be built. This **reduced risk** is also expected to feed into other more long-term housing outcomes such as the mitigation of affordability issues. These outcomes will be discussed in more depth within the Output 3 section.

Figure 4.10: Output 2 Housing Outcomes

Creation of new / expansion of existing communities

Influence on local housing market via saturation / driving demand

Reduced risk in housing market stimulates developers

POTENTIAL UNINTENDED OUTCOMES

There will be many potential unintended outcomes that result from funding being drawndown and new infrastructure being delivered, but three have been identified by MHCLG and other departments as needing the most consideration when evaluating the Fund.

As shown in Stage 2 Outcomes, with HIF FF now secured, developers may focus more resources and efforts on completing housing within these sites and subsequently move activity away from other non-HIF sites. This may result in **displacement of housing** where additional homes are successfully built on HIF FF sites, but the number of homes built in other locations reduces. This could then lead to **increased developer concentration**.

Similarly, if there is a concentration of activity within HIF FF sites, demand for house-building labour in non-HIF sites may fall causing a **displacement of labour**. This is important to monitor as it may create labour shortages, wage competition etc… that could further impact the delivery of housing on HIF sites and elsewhere. Overall, these unintended outcomes are important to capture in the evaluation approach as a key objective of HIF FF is to develop additional homes, which also accounts for displacement - i.e. that by supporting housebuilding on HIF sites there is a risk this displaces homes being built on other sites not benefiting from HIF funding.

Figure 4.11: Output 2 Unintended Outcomes

Increased developer concentration

Housing displacement –location shift

Housing displacement - labour
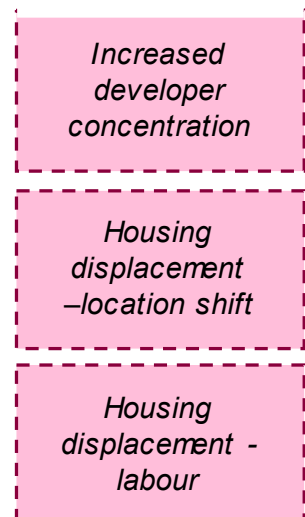
Stage 3 Activity: Housing

Once infrastructure is delivered (Output 2), it is expected that two housing related activities will subsequently occur (Figure 4.13: Stage 3): all planning permissions required for the additional housing will be granted, thus allowing building of additional homes on HIF sites to begin. Delays relating to planning permission this would impact timescales for the subsequent housing to be built and the associated outcomes and impacts.

Figure 4.12: Stage 3 Activities
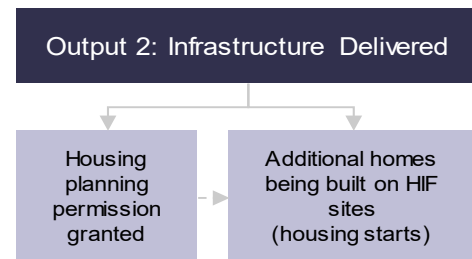
Output 3: Additional Housing Completed

At this stage in the process, it is expected that additional housing will have been completed thus delivering the third and final output within this TOC (Figure 4.14: Output 3). If the estimated additional housing (within projects) is delivered and within the estimated timescales, it is expected to produce both long-term infrastructure and housing outcomes and ultimately feed into the impact of HIF FF. Whilst there are arguments to classify it as either, for the purposes of this evaluation scoping, additional housing has been considered as an output, rather than an outcome. This has been agreed, in consultation with MHCLG, because additional housing is a key deliverable of the policy and will help achieve the programme's goals.

INFRASTRUCTURE OUTCOMES

By this stage of the process all required and intended infrastructure would be expected to have completed and therefore the intended ***long-term transport plans have been achieved*** (for relevant projects). As a result of this new ***infrastructure, there will be better-functioning communities***, namely those where infrastructure – be it transport, schools, GPs, public spaces, etc. – are not overstretched and able to accommodate a growing population.

Figure 4.13: Output 3 Infrastructure Outcomes
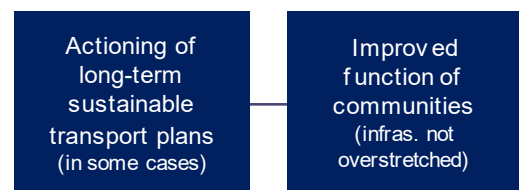
HOUSING OUTCOMES

Delivery of additional housing is expected to ***mitigate affordability issues*** in the local area. Although overall impact on house prices is hard to anticipate, the amount of affordable housing delivered in line with the proportions estimated within the HIF FF bids should mean the availability of more affordable homes in the area, such as social rented, affordable rent and shared ownership tenures, as well as housing being more affordable relative to a counterfactual without HIF from new housing supply altogether.

Figure 4.14: Output 3 Housing Outcomes
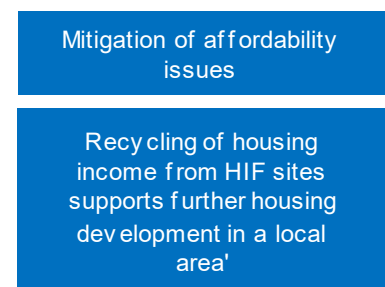
The final housing outcome expected is that the funding recovered by Local Authorities from developers and landowners on HIF FF sites is in line with expected recovery plans and prevailing conditions, with a resulting ***increase in spending on housing development by the Local Authorities***.

Impact

All the activities, outputs and outcomes shown in the TOC are expected to contribute to HIF FF having its overall intended impact (Figure 4.15). Ultimately, the drawing down of funds will allow required infrastructure to be built, thus unlocking land and making the development of additional housing possible. This housing will be appropriate (e.g. affordable, accessible, desirable, sufficient) therefore increasing home ownership and reducing overcrowding. The ability for HIF to deliver this impact, and within the expected timescales, are subject to how the activities, outputs and outcomes are realised. Therefore, in order to measure the impact of HIF FF, a successful evaluation approach should measure and assess all these elements.

Figure 4.15: Impact

Contributes to the delivery of more, and more appropriate, housing through increased access and affordability in both house prices and rents resulting from additional housing supply being delivered.

UNINTENDED IMPACTS

In addition to more appropriate housing, the ***realisation of sustainable, healthy and well-serviced communities*** will be an important unintended impact to also evaluate. This impact is expected to result from the two infrastructure outcomes resulting from Output 3 (Additional Housing Completed). Long-term sustainable transport plans being actioned and communities functioning better as a result of new infrastructure should help to make the communities located on HIF FF sites sustainable and well served. It is important to consider this unintended impact as it has been identified by stakeholders as a potential, positive impact that some projects may deliver, especially amongst those who made explicit reference to 'place making' goals within their HIF FF bids.

5. Impact Evaluation Framework

Overview of Evaluation Framework

The evaluation framework was developed as an intermediate stage between the TOC and evaluation plan. It was developed from a systematic review of all elements of the TOC and describes the potential or ideal indicators and likely data collection methods to support the design of the final evaluation approach.

The framework is split into two sections. The first section deals with the project outputs (funding drawdown by Local Authorities, infrastructure delivery and the completion of additional homes) and the second deals with the outcomes that are expected to result from each output.

Project outputs

Figure 5.1: Project outputs
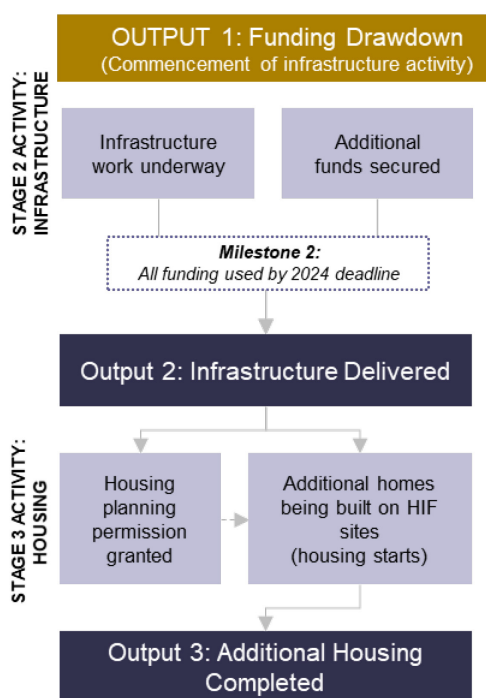
As the project outputs are activities largely undertaken by, or closely monitored by, Local Authority FF teams, evidence of these outputs will be gathered through ongoing reporting by the Local Authority team to Homes England. This data will allow MHCLG and the Central Evaluator to check how Local Authorities are delivering against what was planned for in their bids, specifically around the activities that the TOC defines as critical steps to the realisation of the project outcomes.

The last outcome, 'additional housing completed', includes key milestones in the delivery of homes that Local Authorities will need to report on, such as planning permissions and homes completed on FF sites. Whether or not these homes are 'additional', i.e. they would not have been built without the delivery of the FF infrastructure, will be estimated by the counterfactual impact evaluation, which will take place at scheduled points over the project timeline.

Project outcomes

The purpose of the second section of the evaluation framework is to identify the outcomes that the FF is expected to deliver and map out how each one will be evaluated throughout the lifetime of the project. This is more complex than the outputs section, as the project outcomes will need to be measured by a wide range of indicators, which demand different data sources and collection methods.

Figure 5.2: Project outcomes
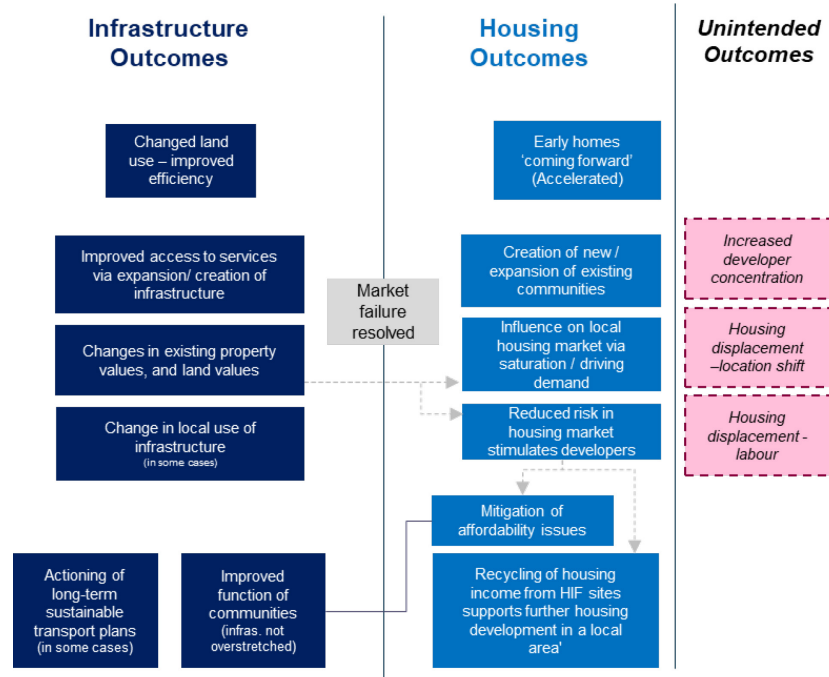
The framework details the following for each indicator:

- The 'evaluation element' through which the indicator will be measured. These elements consist of counterfactual impact modelling using pre-existing data sources, qualitative interviews with developers and Local Authorities, qualitative case studies with a selection of projects, and secondary analysis of Local Authority output data. For example, the output, 'increased confidence, reduced perception of risk to developers in housebuilding in FF areas' will be measured through qualitative interviews with developers.

- For indicators measured using counterfactual impact modelling or Local Authority data collection, where secondary data sources are required, the 'data sources / access' column identifies potential appropriate data sources. For example, the ONS House Price Index can be used to assess the value of homes built on HIF sites and through counterfactual modelling, the project's influence on the local housing market.

- Confirmation of the use of a counterfactual (or not) for each. Some indicators will be measured against a counterfactual in order to attribute change to the FF project, either using statistical modelling based on pre-existing data, or through pre/post primary data collection (the latter is used for measuring the change in use of infrastructure).

- The timing of when each indicator should be measured. This is defined by both the evaluation phase that each indicator belongs to (detailed further below) and the frequency with which data should be collected.

- The priority given to each indicator, defined by MHCLG's policy priorities and the relative importance of each measurement to the achievement of the overarching objective of delivering additional homes, informed by the causal relationships identified in drafting the Theory of Change. Each indicator is marked as either essential, medium priority or low priority. Ideally each indicator would be explored in the evaluation,

however this column provides guidance on those less imperative to the evaluation if it is not feasible to measure all of the indicators.

Data sources

The data available is key in the development of an evaluation framework. FF projects are complex, with early stages of each project focusing on infrastructure investment, with some early housing being built and then the full housing supply being delivered in the years after infrastructure opening and some years after FF projects received funding.

During both infrastructure delivery and housing delivery, there will be administrative actions taken, recording the completion of key delivery steps, such as the planning application records for both housing and infrastructure schemes. The various administrative data sources are explained in detail in Appendix 2.

There will also be locally collected programme data from Local Authority grant recipients to monitor achievement of outputs. However, the evaluation scoping study will also make recommendations for data such as the number of homes started and completed on FF sites, that recipients will be asked to collect for the purposes of impact evaluation, in line with the EF. Detailed guidance will be provided to provide clarity on the rationale for collection and intended use, and on the format and timing of collection for consistency and quality. Where possible, data reporting should be aligned to and integrated with the monitoring tools being used by Homes England to minimise duplication and reporting burden for Local Authorities.

Framework summary

The framework is set out in full at Appendix 1 and is intended to be read alongside this report. Table 5.1 and 5.2 below offer a high-level summary of the indicators to be measured for each output and outcome, as defined in the TOC.

Table 5.1: Summary of evaluation framework outputs

Output	Definition	Indicator(s)
Funding Drawdown	Infrastructure work underway	Funding is received according to expected timelines
		Infrastructure work commences to expected timelines and scope
	Additional funds secured	Funding is available for full infrastructure projects
Infrastructure Delivered	Infrastructure is completed	Infrastructure work is completed as planned
		Scheme costs are in line with estimates given in FF bids
Additional housing completed	Housing planning permission granted	Planning permission is granted for expected housing developments on FF sites estimated in bids
	Additional* homes being built on HIF sites (housing starts)	Homes are delivered in line with estimated timescales in FF bids
	Additional* homes are delivered	Homes are completed in line with estimated timescales in FF bids

*Additionality of homes will be estimated by the counterfactual impact evaluation, which will take place at scheduled points over the project timeline. This calculation will incorporate gross homes built, net of displacement and 'deadweight' (homes expected to be built regardless of the FF funding)

Table 5.2: Summary of evaluation framework outputs

Outcome	Evaluation element	Indicators
Early homes 'coming forward' (accelerated)	Counterfactual impact modelling (see accompanying technical note for further information) Primary research with LAs, developers (combined with analysis of LA output data)	Homes that were already planned on HIF FF sites are delivered at a faster pace.
Creation of new / expansion of existing communities	Primary research with LAs, developers, homeowners	New facilities and amenities beyond housing are developed on FF sites which contribute to a sense of community e.g. green spaces, schools, commercial activity
Reduced risk in housing market stimulates developers	Primary research with LAs, developers	Increased confidence, reduced perception of risk to developers in house building in FF areas
Influence on local housing market via saturation or driving demand	Counterfactual impact modelling - hedonic modelling (see accompanying technical note for further information)	The value of homes on HIF sites changes compared to no HIF because of i.e. new local supply, and ii. provision of new infrastructure, with welfare improvements reflected in property values.
	Primary research with LAs (planning depts), developers, residents	Homes on FF sites are of higher quality and value than non FF sites because they are well served by other amenities e.g. transport links, amenities, green spaces
Mitigation of affordability issues	Secondary analysis of LA output data	Amount of affordable housing delivered is in line with proportions estimated in FF bids
	Primary research with LAs (LAs, developers)	Perceptions of whether HIF homes have affected affordability of local housing supply in any way (either positively or negatively)
Recycling of housing income from HIF sites supports further housing development in a local area	Secondary analysis of LA monitoring data, supported by primary research with LAs	Profit recovered by LAs from developers and land owners on FF sites in line with recovery plans
		Increased spending by LA on housing development in the LA
Changing land use - improved efficiency	Counterfactual impact modelling - Land Value Uplift calculation (see accompanying technical note for more information)	Infrastructure changes lead to additional land value uplift on FF sites in line with estimates in FF bids

Outcome	Evaluation element	Indicators
Change in local use of infrastructure	Secondary analysis of data gathered by LAs (either from LA's MI data, LA primary collection or existing datasets)	TRANSPORT: Changes in travel times (positive and negative) in the corridors of interest, including analysis of the difference between outturn results and scheme forecasts at route level.
	Secondary analysis of data gathered by LAs (either from LA's MI data, LA primary collection or existing datasets)	TRANSPORT: Increased choice of modes for journeys, and improved choice of accessibility, indicated through changes in traffic flows in corridors of interest, patronage of public transport systems in the area (e.g. bus/tram passenger flows) and counts of pedestrians. This should include analysis of the difference between outturn results and scheme forecasts at route level if given in bids.
	Secondary analysis of data gathered by LAs (either from LA's MI data, LA primary collection or existing datasets)	TRANSPORT: Reduction in variability of travel times (to indicate increased reliability) in the corridors of interest, including analysis of the difference between outturn results and scheme forecasts at route level if given in bids.
	Secondary analysis of data gathered by LAs	FLOOD DEFENCES: Pre-existing households in surrounding area benefit from reduced risk of flooding
	Primary research with LAs	GREEN SPACES: Pre-existing households benefit from use of additional green spaces / amenities
	Secondary analysis of LA-collected data	SCHOOLS: increased capacity in schools and choice for parents
	Secondary analysis of LA-collected data	GP SURGERIES: increased capacity at GP surgeries / increased choice of surgeries for patients
	LA updates on infrastructure delivery	UTILITIES: further development sites potentially unlocked by provision of new utility facilities
	LA updates on infrastructure delivery	OTHER: reduced amenity impacts from remediating poor quality land or land with blight
Improved access to services via expansion / creation of infrastructure	As above for 'Changes in local use of infrastructure'	As above for 'Changes in local use of infrastructure'
Changes in existing property values, and land values	Counterfactual impact modelling (see accompanying technical note for more information)	Increase in property values of existing housing on and around FF sites due to improvements in infrastructure
		Additional homes are built in areas surrounding HIF sites (not included in bids) as a result of FF
		New commercial spaces are developed on HIF sites and surrounding areas (not included in bid estimates) as a result of FF
Actioning of long-term sustainable transport plans (in some cases)	Primary Research with LAs	LA's long-term transport plans achieved
Improved function of communities (infrastructure not overstretched)	As above for 'Changes in local use of infrastructure', also to be covered in primary research - case studies	As above for 'Changes in local use of infrastructure'
Housing displacement - location shift	Counterfactual impact modelling (see accompanying technical note for more information)	Additionality modelling and primary research shows displacement rather than additional houses being built

Increased developer concentration		Developers move activity to FF sites away from other non-FF locations
Housing displacement - labour		Demand for labour in house-building falls in non-FF locations

6. Evaluation approach

Approach overview: phased evaluation model

Of the 31 projects currently going forwards, fund awards range from £13-291 million and with the majority focussed on transport improvements – principally road but also covering rail investments such as increasing rail capacity (for example investment in rolling stock) or new rail links (such as new train stations). All projects, even those with lower funding awards, are strategic and long-term in nature; delivery of the proposed infrastructure is expected by the mid-2020s, while housing will be delivered up to 2071. However, within those broad timeframes, there is considerable variation in the expected completion dates for both infrastructure and housing elements. For example, timeframes for housing completions vary by as much as 50 years between the earliest and latest expected.

Figure 6.1 shows the proportion of total homes estimated to be delivered across all confirmed projects[9] over time, starting in 2019/20 to 2051/52. Data for Figure 6.1 is sourced from original and submitted business cases and the housing completion profiles provided within them. Figure 6.1 demonstrates that although 79% of total estimated homes will likely be built by 2036/37, it is expected to take until 2071/72 for 100% of homes to be completed. This variance makes it difficult to put specific timings around any proposed evaluation activities.

Figure 6.1: HIF FF estimated homes cumulative delivery timeline
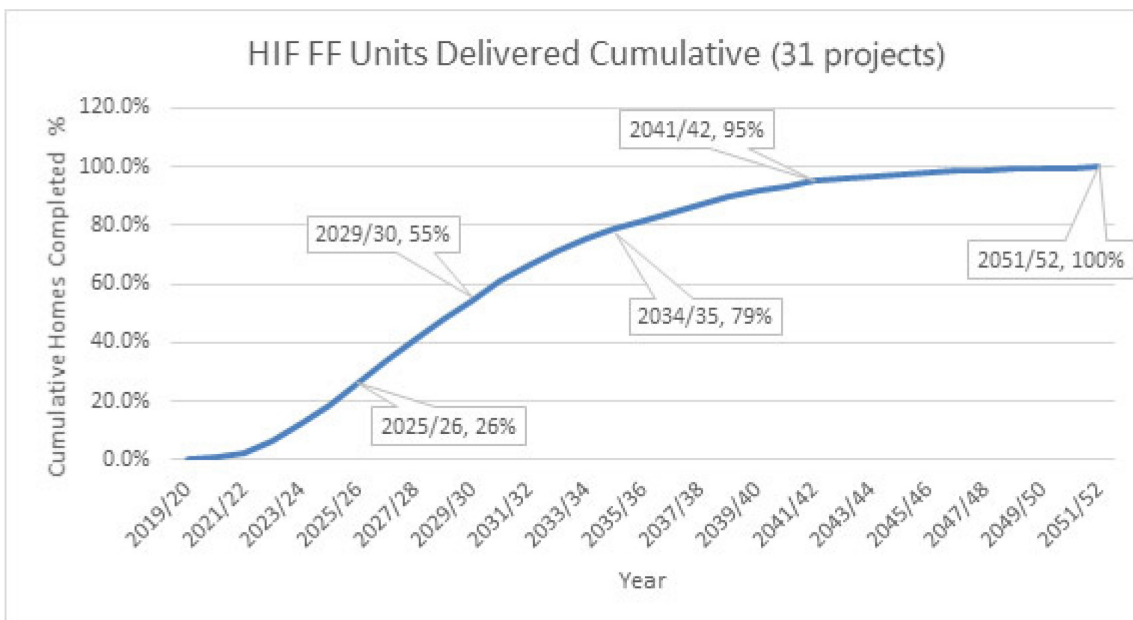
We therefore recommend a phased evaluation approach designed around *the completion of key milestones*. The phases will be conducted at a given point in time across the portfolio of projects, meaning projects may be at varying points in their individual project lifecycles when evaluation activities take place at each phase, but we expect the majority

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to have completed the relevant milestone. This recommendation supports not only the complexity of HIF FF timelines, but can also be leveraged to build robust evidence over time, taking advantage of the full range of data sources (see Appendix 2 for more information) and impact assessment techniques at the most relevant moments.

Based on the 31 projects currently going forward and their intended activities, we suggest four phases of evaluation, comprising three core phases plus a baseline. These centre around the common milestones for projects and when evaluation and impact assessment would be most viable along these lifecycles. Indicative timings have been applied to each phase of the impact evaluation, based on the cumulative number of homes estimated to be delivered. However, further work will be required at the baselining phase to review individual project timelines and to refine the timings of evaluation phases to align with when the majority of projects are expected to reach the relevant milestone.

Furthermore, while evaluation activity will be conducted across the portfolio at a given point in time, not all projects need to be evaluated for the stated milestone at that point. For example, while most projects may reach the housing delivery phase at 2029/30, a larger project with a longer timeline may be evaluated for their infrastructure delivery in 2029/30, and their housing delivery activity will be evaluated at a later stage.

Figure 6.2 illustrates the project phases and their indicative timings. This figure also includes the stages of the process evaluation, which will begin before, and run concurrently with the impact evaluation. The original scope of the HIF FF process evaluation was the implementation of the fund up to the point of contract fulfilment – specifically, to the point of infrastructure delivery (i.e. the delivery of infrastructure). However, a decision was taken to expand the scope to the point of housing delivery (Process phase 3 in the diagram), as there is a desire to support the impact evaluation with additional understanding of the process by which infrastructure delivery leads to the expected additional housing (or otherwise).

Figure 6.2: Evaluation phases and estimated timings

Process Evaluation	Impact Evaluation
Process Phase 1: Bidding & Award (2020/2021) 1) This phase will involve a full evaluation of the bidding process from EOI through to point of contract. 2) It would include a mix of qualitative and quantative research with all those involved in the process	**Impact Phase 1: Baseline Data Collection and Approach Refinement (2021)** 1) This phase will involve a review of the Fund portfolio and the creation of an analytical typology (with underpinning theories of change), the collection of baseline data, and refinements to the proposed impact evaluation approach – including identification of case studies and more detailed evaluation timescales. 2) We anticipate the final design will combine quasi-experimental and theory-based approaches, to build a robust picture of impact over time.
Process Phase 2: Post-Contract (2020-2021) 1) This phase will involve ongoing monitoring and evaluation of the post-contract process up until the point of infrastructure delivery. 2) It would include a mix of qualitative and quantitative methods to assess project delivery i.e fund drawdown, reporting, support received, contract management, satisfaction with PM etc primarily with Las. 3) It will support the impact evaluation through exploration of whether the infrastructure was delivered as intended.	**Impact Phase 2: Infrastructure Delivery (2024/2025)** 1) This phase aims to measure the infrastructure outcomes associated with the fund, once the infrastructure has been delivered. 2) It would include primary qualitative research with developers and Las as well as secondary analysis of LA data. 3) Early additionality estimates would involve testing modelled outputs to establish evidence about what would have happened without HIF, through the validated models from the business cases.
Process Phase 3: Post Infrastructure Delivery (2025-2030+) 1) This phase will use the same approach as Process Phase 2, but monitor the delivery process after infrastructure to assess its impact on housing delivery. 2) It is needed to support the analysis and findings of the impact evaluation, rather than be for the purpose of process evaluation.	**Impact Phase 3: Housing Delivery (2029/30)** 1) This phase is expected to deliver the first analysis of housing outcomes associated with the fund. 2) It would include primary qualitative research with LAs and developers, complimented by analysis of LA output date as well as additionality modelling using a spatial differencing approach.
	Impact Phase 4: Post-Housing Delivery (2030+) 1) The final phase is intended to further explore the longer-term housing outcomes from the fund, particularly those relating to community-wide impacts. It would include primary qualitative research with Las and developers including case studies. 2) The modelling approach used in the housing delivery phase would be repeated to explore the long-term trajectory of additional housing supply and to allow some cross validation to explore the sustained impacts.

The phases relating to the impact evaluation and rough timings are recommended to be:

- **Impact phase 1. Baseline data collection and approach refinement:** This phase is intended as a chance for the central evaluator to review the portfolio of the funded projects in detail and consider the implications for the planned approach to impact evaluation and timing of future phases. It will comprise desk research and interviews with grantholders, baselining outcomes and development of a more

detailed work plan. We recommend that once all projects have been reviewed, the evaluator creates a typology of all FF projects to enable the development of more detailed work plans. This phase will take place in 2021 as contracts are finalised, alongside a phase of process evaluation.

- **Impact phase 2. Infrastructure delivery:** This phase aims to measure (primarily) the infrastructure outcomes identified in the ToC once the infrastructure has been delivered. It would comprise primary research, secondary analysis of outcomes data and early additionality modelling relating to change of land use and unlocking of homes. This phase will take place once the infrastructure is delivered (some early homes also being delivered at this point). The timing will vary by project but the earliest is expected to be roughly 2024-2025.

- **Impact phase 3. Housing delivery:** This phase is expected to deliver the first analysis of housing outcomes associated with the fund through primary research, secondary data analysis and additionality modelling, and validating earlier land value uplift modelling. It should take place once significant volumes of housing are completed and sold for the majority of projects, estimated to be 2029/2030.

- **Impact phase 4. Post-housing delivery:** This final phase is intended to further explore the longer-term housing outcomes from the fund, particularly those relating to community-wide impacts. The methodology involves a final wave of primary research and a further wave of the additionality modelling to validate previous findings through the inclusion of the full portfolio of projects. It should take place after housing delivery, from 2030 onwards.

Each of these phases will evaluate outcomes related to their respective project milestone, informed by monitoring data to confirm whether project outputs have been delivered as intended. Outcomes are measured through a wide range of methods as detailed in the Evaluation Framework in Appendix 1 below, using counterfactuals wherever feasible and making as much use of existing data as possible.

It should be noted, however, that across and between the above phases, it is expected that Local Authorities and Government will be collecting data on an ongoing basis for use at these specific analysis points. Data requirements will change across each phase, as outlined below, requiring ongoing data management by MHCLG and/or Homes England.

The rationale for this approach to impact assessment is articulated below, followed by a section detailing each phase of the proposed evaluation.

Phasing impact analysis

There is evidence to suggest that by building the picture of impact up over time the evaluation can reach the highest levels of robustness even without an RCT (SMS 4). This is particularly the case for approaches used in final stages of any evaluation when a great deal of mature data is available. To answer our key evaluation questions - how much new house building can be attributed to the fund and the changes in land use that result in value changes – we have identified three approaches, with differing levels of robustness:

1. The first approach would employ testing modelled outputs to establish evidence about what would have happened without HIF through the validated models used

during bidding. There are two parts to this first approach: approach 1a (A1a) focuses on land value uplift modelling; and approach 1b (A1b) on dependent housing modelling.

2. The second approach identifies a counterfactual, a comparator similar to the HIF spatially, to understand the housing supply performance that would have occurred without funding. Again, this approach comprises two elements: approach 2a (A2a) estimates what level of housing is displaced from other areas; and approach 2b (A2b) extends this analysis to estimate deadweight by selecting areas similar to the development area but unaffected by close proximity.

3. The third related approach builds on recent work using the detailed geography of data available to evaluation (Approach 3). This allows the variation in the intensity of treatment to provide further dimension to the counterfactual. This analysis helps to refine method 2 in terms of selecting comparable areas, adding detailed geographical drivers such as accessibility in this selection.

Our recommended approach incorporates all three methods – which produces increasing robustness over time – and mixes them over the three analysis phases of the evaluation. The study also considered some alternative methods, assessing some as unsuitable for the evaluation, primarily in terms of whether the approaches could provide robust impact measures given their applicability to the policy, the data collection needs and the likelihood of the approach to attributing impacts accurately and in a timely manner. Annex 4 details these alternative approaches.

There are broadly three levels at which analysis can take place, with each having administrative or commercial processes associated with each that would provide data about impacts and to model additionality:

- **Dwelling unit.** There will be administrative data associated with completion (building control) and with sale (registration with HM Land Registry, Energy Performance Certification).

- **Housing development.** Developers will apply for planning permission generating considerable detail about the development. The commercial transactions after permission, such as major procurements, are tracked by commercial providers.

- **Area level.** Statistical data is usually at a ward, ONS Lower Super Output Area or Local Authority level.

Robustness increases over different approaches and over time; also, some robust approaches can only be considered at later stages or the end of the delivery period as they will use data about the sale of completed houses. Put another way, the most robust approaches require the most data, with that requirement only being met as impacts materialise and are observable in the data. Table 6.1 below describes the intended phasing of the evaluation and indicates evaluation approaches, firstly looking at the main datasets that will become available for each stage.

Table 6.1: Additionality modelling by evaluation phase

Stage of evaluation	Infrastructure Delivery	Housing Delivery	Post-Housing Delivery
Impact analysis approach			
Main datasets for analysis	Construction sector intelligence Infrastructure post-opening usage	Completion certificates (Homes England); Construction sector intelligence	Land Registry transactions data; EPC; Completion certificates; Construction sector intelligence
Spatial level of analysis	Housing development	Area level	Dwelling and area level
Gross houses built in development	Planned dwellings	Actual completions Proxy for progress to plan	Actual completions
Less Displaced supply from other locations	Not estimated	Spatial differencing to neighbouring areas (A2a)	Spatial differencing to neighbouring areas (A2a) Spatial differencing to neighbouring areas (A2b)
Less Deadweight as would have occurred anyway	Modelled land value uplift and unlocking (Approach 1a and 1b)	Spatial differencing as the counterfactual (A2b)	Accessibility effects in hedonic (A3); Validating land value uplift modelling (A1a)
Costs analysis at housing development level			
Scheme costs	Delays and cost overruns analysed in terms of risks	Actual costs and schedule vs budget and optimism bias	Outturn including developer contributions

At the early stage, a focus on infrastructure delivery will mean some post-opening data about infrastructure usage would be available and used for evaluation. In the later stages, focus will shift to additional housing, whereby any assessment starts with the housing delivery by projects (gross housing). Estimates for this will mature: the new housing in each HIF project can be forecast in the infrastructure delivery phase, prior to building, but then gradually this measure becomes more accurate as homes are built both providing the actual number of houses and whether these are being built on time (this latter aspect helping to determine the accuracy of forecasts). There will also be data about the housing developments being on track or not through the building process, sourcing this from providers of construction sector intelligence (primarily using planning applications). In the next stages, more data will be available about houses built, either through the building control at completion or actual sales of homes.

Approaches to evaluating cost and schedule impacts

At each stage of the evaluation, project delivery would be evaluated in terms of the key economic impacts: costs and schedule-related impacts. Cost estimates for infrastructure will follow guidance, such as DFT TAG Unit A1.2[10]. These highlight the approaches to be taken both to estimate base costs and to analyse cost and schedule risks. The guidance suggests use of quantitative risk analysis and, for an evaluation, this could form the basis for tracking performance through the HIF projects, whether risk assumptions prove satisfactory and optimism bias appropriate to the projects.

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[10] DFT (2017) "TAG Unit A1.2: Scheme Costs", www.gov.uk

Quantitative risk analysis seeks to put monetary values to the risk register, justifying the setting and management of a contingency. Typically, an infrastructure investment would have some "standard risks" (such as delays in receiving planning permission or increases in the costs of key raw materials) and reasonable assumptions around mitigation measures, and likelihood and impact. This can be used to inform contingencies. During the project whether or not risks materialise will be noted. Key to this is that the risk register is maintained throughout the project.

Evaluation would then review a snapshot of the risks at a particular stage of development. Using any original project level documentation, the risk assessment reflects the best available evidence at the start of the project and is included in the appraisal at the time it is submitted to the Department as part of a bid for funding. As the project progresses, risks will begin to be removed as they do or do not materialise. At the end of a project, outturns can be compared to the expected risk register retrospectively.

This evaluation approach would be suitable for the HIF evaluation. Clearly, one very live issue that could be integrated from the outset of an evaluation is the effects of the Covid-19 crisis. Project costs and timelines are likely to be reviewed in the coming months and a design issue will be to look at projects both before this review and after to gauge the expected change in benefit delivery and cost profile due to changes. This can inform staging in the impact evaluation and probably a few other parts of the benefits realisation.

Impact phase 1: Baseline data collection and approach refinement

The first, crucial phase of the impact evaluation will be a baselining phase, whereby the final approach will be determined based on the exact plans of the 31 projects currently going forwards and their anticipated timings once in contract, and baseline data collected from which to measure future outcomes and impact.

Review of investments

This first phase of the impact evaluation is intended as a chance for the central evaluator to review the portfolio of the funded projects in detail[11] and consider the implications for the planned approach to impact evaluation and timing of future phases. Key information for this purpose will include:
- Project value
- Target location
- Type of infrastructure
- Planned volume of dwellings
- Timeframes for infrastructure and housing completion
- Number and timeframes of projects with a 'place-making' element

In addition to reviewing relevant project documentation, we recommend conducting a round of qualitative interviews with a senior manager responsible for the Forward Fund implementation in each grantholding Local Authority. The purpose would be used as an

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[11] Very limited information about the projects funded through HIF-FF has been available to the scoping study team as the majority of projects are not yet in contract, so this work has not been possible at this stage.

introduction to the impact evaluation, establishing a relationship with each Local Authority and gathering any further relevant information about project design / delivery to support baselining activity (described below).[12] At this point senior managers will also have the opportunity to articulate any significant changes that have occurred since drafting their bid submissions that they believe may impact on their project plan, such as changes caused by COVID 19. The evaluator will take account of these when drafting a detailed evaluation plan and work closely with MHCLG, for example around any changes needed to the project timeline or estimated outcomes.

With full information about the fund portfolio, it is recommended that the central evaluator develops a project typology that can be used for the purposes of structuring future evaluation activity, specifically the primary research elements. The typology would be driven by the information in the projects/contracts and what adds most value to the analysis. It seems likely that a key research question might be which form of infrastructure project leads to the greatest additional housing impact. Therefore, an infrastructure-based typology would ensure that primary research covers all main types in sufficient detail to understand the drivers of impact. However, this is best determined in light of full project information.

We recommend that a more detailed, project-group Theory of Change is created for each typology, which describes in more detail the mechanisms underpinning the funding decisions, particularly around the cause and effect relationship between the infrastructure delivered and the development of additional homes. This will involve defining expected outcomes for individual projects and how they fit within the broader portfolio of projects. The more detailed Theories of Change will allow expected outcomes to be defined more clearly, and timelines to be mapped for their expected delivery.

At this point the evaluator will decide on the most appropriate type of theory-based approaches to apply to the evaluation, to determine if the mechanisms expected to bring about change are supported by sufficiently strong evidence. Possible approaches would include:

- Contribution analysis: This is a step-by-step process used to examine if an intervention has contributed to an observed outcome by exploring a range of evidence for the Theory of Change. It gives an evidenced line of reasoning rather than definitive proof.

- Process tracing: A structured method examining a single case of change to test whether a hypothesised causal mechanism, such as that proposed by the Theory of Change, explains the outcome.

- Qualitative comparative analysis: Used to compare multiple cases and systematically understand patterns of characteristics associated with desired or undesired outcomes based on qualitative knowledge. Can account for both complex causation (combinations of factors) and 'equifinality' (multiple causes of outcomes).[13]

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[12] These interviews should be timed to align with the planned HIF-FF process evaluation interviews to reduce burden on respondents.
[13] HM Treasury (2020) The Magenta Book

Baselining outcomes

A crucial part of this phase will be to identify the approach to baselining for each project. For impacts to be tracked, we recommend that a baseline is collected of the position prior to HIF FF investment projects. As set out in the EF, the key housing outcomes make use of a range of administrative data that is collected routinely in a consistent manner over time and across all locations (see Appendix 1). Where this is the case, it is not critical to conduct the baseline work before ground is broken on any projects although the central evaluation team will need to clarify access permissions and familiarise themselves with the relevant data sources and publication timelines.

It is possible, however, that some infrastructure outcomes, particularly transport schemes, require baseline primary data collection.

Transport modelling would have been undertaken for HIF proposals at the business case stage (a review of the 31 projects currently going forwards, suggested that at least 25 have business cases underpinned by transport models). This includes all projects for whom transport infrastructure is their main component. Business case development would have involved calibrating and validating the transport model estimates, reporting evidence that the model adequately represents baseline traffic flows. Validation would have involved comparison of model baseline forecasts to independent data on road speed, traffic/passenger flows and PT crowding, following WebTAG guidance unit M1.

The baseline phase will involve viewing the validation reports compiled at the bid assessment stage and identifying the data sources used. We propose that this analysis is repeated at the infrastructure delivery evaluation phase to assess whether the expected additional infrastructure capacity has materialised as planned. Whilst the data analysis – and any bespoke data collection required - would take place at the infrastructure delivery phase, the method of (and responsibility for) collection would be agreed during the baselining phase.

For transport infrastructure, discussions should take place at this stage between MHCLG, Local Authorities and the contracted evaluator to scope out what data can be provided from monitoring and evaluation already being conducted by third parties. It is likely that some transport infrastructure schemes will fall under the remit of third parties such as Highways England, Network Rail or the Department for Transport, and therefore likely to be subject to monitoring by such organisations. In these cases, third party pre- and post-opening data should be used for this evaluation, if it can be made available. Where no data collection is planned by third parties (or it cannot be accessed), Local Authorities could collect it themselves or MHCLG could commission evidence to be gathered independently.

This phase will also need to consider whether data collection is required to identify routing effects outside of the immediate HIF sites. There may be some scheme specific issues (such as modal switch or goods vehicle flows) that require particular planned collections and the evaluator will consider in the baselining phase whether baseline data collection is

required to supplement the validation report in line with guidance[14]. This will need to be discussed with Local Authority leads on a project-by-project basis.

In addition to the transport infrastructure projects, there are some FF projects that are not related to transport but rather utilities, land assembly or remediation. We do not expect baseline data collection to be relevant / appropriate for these projects, however this should be revisited on review of the full project documentation. Bespoke evaluation approaches may well be required for these projects.

Identifying impact case studies

We recommend the impact evaluation includes project case studies, to explore whether and how infrastructure improvements have addressed the barriers for developers and private sector investment and created the conditions for housing development. Case studies are particularly helpful when aiming to attribute outcomes to an intervention that is indirect or operating at a whole system level.[15] They would bring in qualitative and quantitative research to create a holistic picture of the Fund's impact and we suggest that they are longitudinal to follow the project through the various stages of its life cycle – aligned with the phased evaluation approach. This also ensures the evaluation is able to provide tangible examples of FF outcomes and impacts over time.

The selection of case studies would be made during this baseline phase but we recommend that they include a mix of projects against the following variables:
- Project value (banded)
- Geography (by region)
- Primary infrastructure type (possibly split by value)
- Secondary infrastructure elements being funded
- Those which have / have not made a commitment to delivering affordable homes
- Those which do / do not have a 'placemaking' elemen

In respect of the 'placemaking' element, there are some projects that have the explicit objective of delivering well-planned communities to support new homes. There are specific indicators within the EF that will be measured only for placemaking projects, such as the construction of new schools and green spaces, and for which the case studies will provide the key evidence of impact.

Creating an evaluation timeline

Following this baseline phase, the central evaluation team will have the information needed to plan the following phases of evaluation activity. With a greater understanding of planned timescales for completion of infrastructure and housing across the project portfolio, it will be possible to determine when a sensible point to conduct each phase will be based on when most projects are expected to have completed the relevant milestone i.e. infrastructure or housing delivered.

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[14] DFT (2012) "Monitoring and Evaluation Framework for Local Authority Major Schemes", https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/9154/la-major-schemes-monitoring-evaluation.pdf
[15] HM Treasury (2020) The Magenta Book

As described in the introduction to the evaluation approach, the current timelines set out in this report for each of the evaluation phases are based on estimates of when the majority of infrastructure, and then homes are estimated to have been completed. Not all projects however will align with this timeline. It will likely be necessary for the evaluation to run on slightly different timeframes for different projects or project typologies – the size/value of project seems most appropriate given that the larger scale projects are likely to take longer to deliver. So, for example, the housing delivery phase may take place once in 2029/2030 when X number of projects have delivered their outcomes, and then again after 2030 when the remaining have done so. The other evaluation phases would take place in the same staged manner. Once project timelines and plans are known, these options can be tested to determine the most appropriate for FF evaluation needs.

Impact phase 1 outputs

The baseline phase should culminate in an updated impact evaluation plan, producing a full-scoped approach and timeline based on the scoping activity above. It should also produce a 'baseline report' setting out the key statistics relevant to the evaluation, the intended plans for the 31 projects currently going forwards, and early findings on objectives and outcomes as expressed by Local Authority interviews.

Impact phase 2: Infrastructure delivery

The primary purpose of this phase is to measure the immediate outcomes of the infrastructure delivered. Specifically, it would expect the delivery of infrastructure funded by the FF to lead to:

1) An immediate change in how existing users in the local area use or experience the new infrastructure
2) A more efficient use of land on FF sites resulting from the new infrastructure, signified by an uplift in land value, suggesting the increased potential of new housebuilding
3) For some projects, the completion of Local Authority objectives laid out in their long-term Local Transport Plan

In addition, in some sites we may also expect to see changes in the use of, and delivery of local infrastructure beyond that specifically funded by the FF. This is expected on sites that have a 'placemaking' objective, i.e. they have the explicit objective of delivering well-planned communities, where Forward Funding is expected to lead to additional infrastructure being delivered above the core infrastructure task.

While the focus of this phase is to assess the actioning of these infrastructure outcomes, some early indicators of additional housebuilding may also be observable. We would expect the delivery of infrastructure to give developers increased confidence in the housing market on FF sites, for more development planning and activity to be taking place at these sites, and for some planning applications for housing developments to be underway. It will therefore also be possible to get an early indication of the amount of 'displacement' occurring in the housing market, by monitoring the extent to which developers have or are planning to move their activity to FF sites, at the expense of building in other areas.

To provide evidence of the above, we suggest this phase include analysis of data collected by Local Authorities, the first rounds of impact modelling, qualitative interviews with Local Authorities, and the first qualitative research to develop FF case studies. Table 6.2 below shows a summary of the outcomes intended to be measured at this phase and the method of data collection.

Table 6.2: Summary of outcomes to be measured at Infrastructure delivery phase

Outcome type	Outcome	Data collection method
Infrastructure	Changing land use - improved efficiency	Counterfactual modelling to estimate Land Value Uplift
Infrastructure	Change in local use of infrastructure	Primarily, data collected by the Local Authority (exact method will vary depending on infrastructure) and in some cases, qualitative interviews with Local Authorities by the central evaluator Longitudinal case studies to look at projects with and without a 'place-making' element
Infrastructure	Improved function of communities (infrastructure is not overstretched)	Primarily, data collected by the Local Authority (exact method will vary depending on infrastructure) In some cases, qualitative interviews with Local Authorities by the central evaluator
Infrastructure	Actioning of long-term action plans	Qualitative interviews with Local Authorities
Housing	Reduced risk in housing market stimulates developers	Qualitative interviews with Local Authorities & developers
Unintended	Increased developer concentration	Counterfactual modelling and qualitative interviews with developers
Unintended	Housing displacement – labour	Counterfactual modelling and interviews with developers

We suggest this phase culminates in an interim evaluation reporting. This report should bring together findings from all elements below to provide a clear update on FF progress against its intended outcomes and an update on local case studies to highlight any ongoing or emerging successes (or issues).

Local Authority data collection

The method of measuring the use of FF infrastructure will vary depending on the type of infrastructure being delivered. Road and rail developments for example will require traffic and ridership counts while new flood defences will require reports by expert professionals to certify the work completed has had the desired impact. Furthermore, HIF projects may have been granted funding for several different types of infrastructure on a single site therefore one project may involve multiple different data collection methods.

Table 6.3 shows the different types of infrastructure funded through FF, the suggested indicators by which change in usage should be measured and likely data sources. As there could be a range of data collection at each site and the suitability and availability of data is likely to be best understood at a Local Level, we recommend that each Local Authority leads on gathering the required data for this outcome.

Table 6.3: Data to be collected by infrastructure type

Infrastructure type	Indicators measured	Data collected by	Possible data sources
Transport (Road / Rail)	1) Changes in travel times 2) Increased choice of modes for journeys 3) Reduction in variability of travel times	Local Authorities	Local Authority transport monitoring data, Local Authority primary data collection, ONS, DfT, Highways Agency Environment Agency, flood risk specialists
Flood defences	Pre-existing households in surrounding area benefit from reduced risk of flooding	Local Authorities	
Green spaces	Pre-existing households benefit from use of additional green spaces and amenities	Central Evaluator	Primary research with Local Authorities
Schools	1) Increased capacity in schools on FF sites 2) Increased choice for parents and reduced waiting lists for existing schools	Local Authorities	Local Authority school admission data
GP/health services	1) Increased overall capacity of surgeries on FF sites 2) Existing households benefiting from an increase in choice of GP surgeries on FF sites	Local Authorities	NHS England, Local Authority monitoring data
Utilities	New utility provisions support the potential development of additional housing	Local Authorities	Local Authority site monitoring, developer reports
Other (including land remediation &land assembly)	Reduced amenity impacts from remediating poor quality land or land with blight / Immediate impacts on house-building potential e.g. land unlocked	Local Authorities	Local Authority monitoring data

As shown in the table, the data collection requirements will differ by Local Authority dependent upon the infrastructure being delivered.

TRANSPORT

Looking specifically at changes in the use of transport infrastructure, the three indicators can be expanded on as below.
   1) Changes in travel times (positive and negative) in the corridors of interest.
   2) Increased choice of modes for journeys, and improved choice of accessibility, indicated through changes in traffic flows in corridors of interest, patronage of the public transport system in the area (e.g. bus/tram passenger flows) and counts of pedestrians.

3) Reduction in variability of travel times (to indicate increased reliability) in the corridors of interest.

Plans for measuring the outcomes of transport infrastructure will have been agreed at impact phase 1 (baseline data collection and approach refinement). For each indicator, the data collection method should be consistent with that used for the data gathered in the baseline phase and validation reports compiled for bid submissions and reported to the central evaluator at route level. The central evaluator should then compare the results against the corresponding bid submission data and against the forecasted changes estimated in the project's FF bid. The methods of gathering this data (e.g. through traffic surveys and collections near to FF sites) will depend on the location and scale of the project.

As discussed, this data should be gathered in line with the DfT Monitoring and Evaluation Framework guidelines in the same way that it was gathered for the transport modelling at the bid submission phase. As per the guidance, the data should be gathered one year after the completion of the infrastructure.

FLOOD DEFENCES
Where Forward Funding is used for the development of flood defences to unlock land for house building, Local Authorities should confirm that a flood risk assessment has been carried out on completion of the work. This should include some commentary on whether the work has reduced flood risk to the level and land area that was set out in their FF bid document. If the impact of the work has had a different effect to that expected, Local Authorities should report on any knock-on effect this has had to land on the FF site and its development potential.

SCHOOLS
Where schools are built using Forward Funding, the evaluator will conduct secondary analysis of data collected by Local Authorities. Local Authorities will be required to report on the increase in overall capacity of schools on FF sites, the number of applications to new schools, and reduction in waiting lists for existing schools.

GP SURGERIES
Where projects plan to use Forward Funding for building GP surgeries, Local Authorities will be required to report on the increase in capacity of surgeries in their area, the number of existing households benefiting from an increase in choice of GP surgeries in their areas and the number of newly registered patients at new surgeries.

OTHER INFRASTRUCTURE
For other types of infrastructure projects being funded by Forward Funding, such as the delivery of utilities, land assembly and land remediation, Local Authorities will be required to evidence through their monitoring data that the planned work has been completed, and how the new infrastructure is being used. This will include any immediate effects that the infrastructure has had on the potential delivery of new homes such as new land being unlocked for development.

Where Forward Funding is being used for the creation or development of green spaces, data will be gathered qualitatively through interviews with relevant Local Authority staff, as described further below.

Local Authority output monitoring should record the impact of non-transport infrastructure on completion and where applicable, quarterly thereafter during this phase, where data is collected routinely.

DATA REPORTING AND ASSESSMENT
Where data has been gathered by the Local Authority, the Local Authority FF team could be asked in their data submission to make a comparison with forecasts made in their FF bid document and give a short commentary around any significant discrepancies between the forecasted usage and actual usage. The central evaluator will then analyse this data and assess the extent to which there has been a change in the local use of infrastructure, and whether this has led to improved functioning of the community. Where the outcomes are not as expected, the central evaluator will consider whether the assumptions made in the planned project delivery were correct, and what the actual outcome may mean for subsequent expected housing and infrastructure outcomes. This should take account of Local Authority output monitoring data to assess:
- whether the infrastructure itself has been delivered to the specifications laid out in the projects FF bid;
- whether the costs of the infrastructure are in line with estimated costs given in the projects; and
- whether the timing of the delivery of the infrastructure is in line with the schedule outlined in the projects' FF bid.

Reasons behind any discrepancies between forecasts and outcomes should be explored in qualitative interviews with Local Authorities, which might consider changes in external factors or optimism bias in the projects. This will be important in evaluating the success of the Forward Fund and the feasibility of implementing similar policies in future.

Counterfactual impact modelling at infrastructure delivery stage

In the infrastructure delivery phase, some early outcomes could be compared to expected outcomes, providing an early impact assessment using a counterfactual. This early phase in an impact evaluation will centre on evaluating whether housing impacts are on track, as the infrastructure investments supported by FF are completed.

It will look at:
- The land value uplift modelling used in appraising bids, validating to the extent possible whether the housing impacts are on track.
- The cost-benefit and transport modelling used to design schemes to gauge whether planned gross housing levels are likely to be additional in the sense of being dependent on the infrastructure investment.

The approaches could use local level data, as indicated in the tables above, but also begin to integrate national datasets (Appendix 1), such as construction sector data and infrastructure post-opening usage. To some extent, this early evaluation can also help to direct the data compilation processes to enable the later stages of the FF evaluation.

For the appraisal of FF bids, land value uplift has been estimated by modelling the difference between the sale price of houses and sum of the development costs including existing use value. Any difference observed, once adjusted for any housing that would

have occurred anyway (the deadweight) or displaced, is indicative of the value change attributable to the FF project.

Testing whether these modelled benefits, against a counterfactual of no development, are accurate during the evaluation could centre on some key assumptions made in the modelling (such as the assumed value per square foot of the sold house, its construction and associated development costs, the value of the land its old use) and assumptions about the displacement effects and any deadweight associated with the project.

HMT Aqua Book[16] outlines how cost models can be verified and validated through the progressing of a project, with more and more of the cost assumptions being validated by actual data. So, while at project inception many of the costs will be assumptions though some grounded in real data (such as the land acquisition costs which the developer has already incurred), as projects develop actual market transactions have occurred to improve the confidence of any assumptions, potentially shows optimistic or pessimistic initial forecasts. The approach to validating the models might well mix evidence gathering from the projects (out-turn costs, delivered volumes of housing, developer contributions etc) with specific data collection. Some of the data collection that might be considered could be independent assessments of key aspects of the land uplift calculation, for example a surveyor's valuation. Further, some parts of the cost modelling will be validated by the other quantitative approaches below.

A second model validation approach may be applied, focusing on transport modelling (approach 1b). In appraising HIF bids involving transport infrastructure, TAG Unit 2.2[17] (DFT, 2018) has been used. This analysis uses standard transport modelling tools to understand transport congestion issues in a local area and use the models to determine, as more housing is added to the development site, what level of housing the current transport infrastructure and services can reasonably accommodate. Beyond that level, any additional proposed housing development is dependent on the transport improvement. As well as quantifying the dependent development, the approach can value this. Under a well-defined set of circumstances user benefits will capture the entire welfare impact of a transport investment. These conditions are that the feedback effects on travel demand, as a result of land use change, are insignificant and that the rest of the economy is operating perfectly efficiently. For a housing development, there may be distortions or market failures that mean the economy is not functioning efficiently. In these situations, additional benefits (or disbenefits) may arise when the impact of transport improvements is transmitted into the wider economy. The TAG unit supports the estimation of this.

Transport modelling also underpins the estimation of some environmental impacts, particularly the pollution emitted due to transport use. Models estimate fuel consumption and the emission factors associated with fuel use can be used to estimate the greenhouse gases emitted as well as particulates, and the change in this due to any change in traffic associated with the development. This evaluation stage can be used to validate the modelled results for emissions and – where there are differences in the expected traffic outcomes to the actual outcomes – potentially re-estimate these environmental impacts.

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[16] HMT (2015) *The Aqua Book: Guidance on producing quality analysis for government*. March. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/416478/aqua_book_final_web.pdf

[17] DFT (2018) "TAG Unit A2.2: Appraisal of induced investment impacts", www.gov.uk

Evaluating transport projects is routine in major Highways England and Network Rail schemes. Transport post-opening evaluations test whether scheme appraisal approaches are robust and, as HIF has used some relatively new appraisal approaches, there may be additional learning possible at the delivery stage (see Box 1) using the data collected by HIF projects. Local authorities will be encouraged to consider monitoring and evaluating in line with guidance (DFT, 2012) and could include HIF schemes requiring standard monitoring looking at scheme costs, travel times and travel reliability monitored for a year after opening. Some HIF schemes, such as the East London Line, are very large and could fall under the enhanced monitoring criterion, where DFT and the local authority would customise the evaluation plan to the impacts anticipated for the scheme.

In the case of HIF projects, Local Authorities will be required to include housing impacts explicitly in any such monitoring and the outputs and outcomes would centre on:
- Traffic and ridership: this would be a feature of any evaluation, but an addition may be counts/collections at screen lines near to the development
- Planning permissions data: fewer refusals for planning applications on the grounds of transport issues would be an outcome and tracking this could be designed into monitoring perhaps using appraisal modelling of planned developments near the HIF sites
- Developer contributions: monitoring whether CIL and s106 contributions accrue on time and to expected levels could be included in the monitoring
- Housing development risks: Monitoring may be structured to track effects of Covid-19 impacts consistently across HIF

BOX 1: USING POST-OPENING EVALUATION TO IMPROVE APPRAISAL

Post opening evaluations evaluate the strengths and weaknesses in the techniques used for appraising schemes. This is achieved by comparing traffic information/rider levels collected before and after the opening of the scheme against forecasts made during the scheme appraisal. To some extent, the novelty of the appraisal approaches used to identify dependent housing developments will benefit from this form of evaluation, so that improvements can be made in the future.

The appraisal would have made use of four scenarios described in the TAG Unit, each forecasting road traffic or public transport ridership under different conditions and for both the baseline time period and some future points after the scheme has opened. The scenarios are combinations of having the transport infrastructure or not and having the housing development or not with one of the scenarios being the current position of no development or infrastructure, validated at the baseline. One of the three modelled scenarios (scenario R of the scheme with the development) could be validated by evidence gained by the time of the opening of the transport infrastructure, especially if the completion of housing is tracked.

This will confirm the modelling results either at baseline or forecasts. It can also then be used to confirm the TAG unit analysis to estimate the level of housing that the transport system would have accommodated without infrastructure, a modelled counterfactual. This could provide an early indication of additional housing being delivered. Finally, this modelling can also determine the level of transport benefits to travellers outside of the HIF housing development.

Qualitative Interviews with Local Authorities

A crucial element of the ongoing evaluation will be engagement with Local Authorities to explore progress, outcomes and impacts and support theory-based evaluation. Interviews with Local Authorities in this phase will be used to:

- sense check the data that is delivered by the authorities about their infrastructure outcomes, explore possible reasons for any discrepancies between expected and actual outcomes, and any external factors that may have also impacted on these outcomes. It may be necessary here to consider any impacts of COVID 19, whether any expected impacts of the pandemic discussed in the baseline interviews have or have not materialised and what impact they have had on the delivery of infrastructure and the wider outcomes in the Theory of Change.
- identify the role, if any, that the infrastructure delivered has in the Local Authority's long-term transport plans. This should include exploring whether the planned infrastructure was required to deliver subsequent transport improvements (not funded by HIF FF) which may in turn lead to further housing development. In these instances, provisions should be made to incorporate this further housebuilding into subsequent evaluation phases.
- capture any changes Local Authorities have observed in developer activity and the perceptions of risk in the housing market.

Interviews should be conducted with a senior manager responsible for the FF implementation in each of the 31 projects currently going forwards, ideally someone who is familiar with the estimations given in the bid and the delivery of the infrastructure. The discussion should cover the three objectives described above as well as a general discussion on the impacts of the infrastructure delivery, including any unintended outcomes experienced either by the Local Authority or reported by the local community.

We have also suggested qualitative research within the process evaluation which will explore the delivery of infrastructure more fully. There may be scope to align these interviews to minimise burden and reduce duplication.

Qualitative interviews with developers

During this phase, qualitative interviews with developers will be used to explore the impact that the delivery of the new infrastructure has had on developers' perceptions and interest in the housing market on FF sites. In particular, the evaluator will assess whether developers have assessed that there is reduced risk in the housing market in FF sites as a result of the new infrastructure. Where developers express increased interest or activity, these interviews will also explore the extent to which the planned house building is additional or displaced, to provide a sense check on the counterfactual modelling described above. The interview will therefore cover whether their planned activity on the FF site is more than the amount of development they had planned to, or would typically undertake in a similar year, or whether they have moved their activity to the FF site, and are not therefore developing in other areas. There is a risk with these interviews that developers give biased or selective responses to inflate the benefits of HIF. This will be considered in the drafting of questions and probes, developers will be encouraged to speak honestly and findings will be triangulated with those from the Local Authority

interviews and construction sector data analysis described above at this and subsequent phases.

The exact number of developers to be interviewed would be determined during impact phase 1 (baseline data collection and approach refinement), taking into account the number involved in FF projects (assuming some potential overlap). We suggest 10-15 interviews assuming minimal overlap across FF sites. There is also the potential to include interviews with non-FF developers operating near HIF sites to assess additionality and displacement from an alternate perspective, which would also be decided during the baseline as the approach is finalised.

Longitudinal case studies

Longitudinal case studies will be conducted by the central evaluator with a selection of projects to provide real examples of FF outcomes and impact over time. This phase will be the first point of data collection for the case studies.

The evaluator will undertake between eight and 10 qualitative case studies to explore the impact that the infrastructure development has had on the local community. Ideally this would include site visits to each FF area that includes research with local residents and stakeholders from relevant Local Authority teams and wider community stakeholders. Case studies should build upon the qualitative interviews conducted with the Local Authority FF team and developers described above, with additional discussion areas covered in these interviews relating to wider community planning.

Research with local residents will focus on the impact that the new infrastructure has had on them personally, changes they have observed as a result of the new infrastructure, and their views on the benefits and disadvantages of these changes. We suggest four focus groups with local residents in each case study, which can be split by those newer to the area vs. those resident longer term and, within each, good demographic representation (i.e. age, gender, socioeconomic level, lifestage, etc.).

Interviews with Local Authority staff from teams outside of the core FF team will focus on the expected benefits from the new infrastructure, any impact it has had on their service area, and the strengths and weaknesses of it. The audience for these interviews is expected to vary depending on the type of HIF project, but may include planning, highways, parks, the environment, community safety and education. We suggest an average of five interviews per case study but scaling this up/down depending on the needs and relevance for each. For projects that highlighted impacts on biodiversity or other environmental consequences in their projects (either positive or negative), these case studies should also include interviews with Natural England or environmental NGOs, to explore the effect that the infrastructure has had from this perspective.

For some projects, the evaluator will need to monitor changes in the local use of infrastructure beyond the core infrastructure that was funded through FF. These will be projects that have a 'place-making' element to them, i.e. where projects have the explicit objective of delivering well planned communities to support new homes, where Forward Funding will lead to additional infrastructure being delivered, beyond the core infrastructure task. For example, a new transport route may have been created with the primary purpose of unlocking land for housing development, but the route may also have improved local

community access to other amenities, included a new cycle lane or led to the introduction of a new bus route, which in turn reduces traffic congestion throughout the surrounding area. The FF sites selected for the case studies will include both projects with and without a place-making element to provide insight into the different approaches and relative outcomes.

Impact phase 3: Housing delivery

The purpose of this stage of the research is to explore for the first time the housing outcomes associated with the Forward Fund. This phase should be carried out once a significant volume of housing has been completed and sold, scenarios for which would be tested during the impact phase 1 (baseline data collection and approach refinement).

The focus here is on housing outcomes. By this phase enough homes will have been completed to allow more robust methods of counterfactual impact modelling to estimate additional homes built, than was estimated through the approach at the infrastructure delivery phase. It will also be possible to assess the impact that the Forward Fund has had on increasing the rate of housebuilding on FF sites, and its effect on the local housing market. The evaluation methods used in this phase (discussed further below) will estimate the number of additional homes built to date on FF sites, estimate changes in existing property values and land values, and validate the models conducted in the infrastructure delivery phase around Land Value Uplift.

These approaches will be based on area and dwelling level data compiled at a national level (Appendix 1) which will be available after the completion of homes built and sold. A key advantage of these datasets is that they track housing over time and across the country in a consistent manner, covering periods before and after HIF projects and in areas supported or distant from the projects.

In addition to the counterfactual impact modelling, this phase will include a review of Local Authorities' monitoring data, primary research with Local Authorities and developers, and the second data collection point of the longitudinal case studies. The focus of this data collection will be to:
- measure the quality of homes being delivered[18]
- monitor whether the number of homes being delivered, both market value and affordable homes are in line with bid estimates
- monitor the extent to which Local Authorities have been able to recover profit from developers and their plans for reinvesting that profit into further housebuilding

To achieve the above, we suggest this phase include analysis of data collected by Local Authorities, further waves impact modelling, further qualitative interviews with Local Authorities, and the next phase of research to inform the FF case studies. Table 6.4 below shows a summary of the outcomes intended to be measured at this phase and the method of data collection.

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[18] Quality here is defined by the HIF FF policy objective of providing homes that are well-serviced by the local community and infrastructure, rather than by the make up of the homes themselves

Table 6.4: Summary of outcomes to be measured at housing delivery phase

Outcome type	Outcome	Data collection method
Housing	Early homes 'coming forward' (accelerated)	Counterfactual impact modelling Primary research with Local Authorities and developers (combined with analysis of Local Authority output data)
Housing	Influence on local housing market via saturation or driving demand	Counterfactual impact modelling (focusing on value of homes), qualitative interviews and longitudinal case studies (focusing on quality of homes)
Housing	Mitigation of affordability issues through the delivery of affordable housing	Local Authority output data
Housing	Recycling of housing income from HIF sites supports further housing	Local Authority output data, supported by qualitative interviews with Local Authorities
Infrastructure	Changes in existing property values, and land values	Counterfactual impact modelling
Unintended	Housing displacement - location shift	Counterfactual impact modelling

We suggest this phase culminate in a second interim evaluation reporting. This report should bring together findings from all elements below to provide a clear update on FF progress against its intended outcomes and an update on local case studies to highlight any ongoing or emerging successes (or issues).

Local Authority output data

Local Authority FF teams will be required to provide regular monitoring reports about housebuilding on FF sites that have resulted from the infrastructure delivered by the Forward Fund. In this phase focus will begin to shift focus towards housing delivery.

Monitoring data required in this phase is outlined in detail in the evaluation framework but will include a count of the total number of new homes built, and of those, the number of homes sold or rented as affordable homes, i.e. below market rent. During this phase the central evaluator will analyse this data and compare it to the timescales and number of homes expected to be delivered in the projects, to give a formative indication of how 'on track' the projects are. This data can be used to inform the questions asked in qualitative interviews with Local Authority FF teams.

Local Authority FF teams will also be required to provide details of any of the HIF funding recovered from land-owners and developers as a result of Forward Funding. This requirement is included in all successful projects to ensure that where the value of land or existing developments increases as a result of the new infrastructure delivered by the Forward Fund, some of the profit earned is passed back to the Local Authority and invested in further activities to promote housebuilding in the local area. In this phase of the research the central evaluator should assess whether the amount of funds recovered are in line with expectations set out in each projects' Grant Determination Agreement. Local Authorities are not required to reinvest profits recovered immediately so at this stage this

data will only be used to give a formative indication of whether the recovery condition of Forward Funding is being met.

Counterfactual impact modelling

At this stage, further impact modelling will be needed to continue to develop a robust impact assessment. Table 6.4 indicates the outcomes to be tracked in data and – as many measures are collected over time across the whole country on an area basis – there is potential to use a counterfactual. This phase will have two forms of modelling: spatial difference over areas and dwelling-level analysis. Both approaches will focus on the new housing supply outcome, increasing the sophistication of the analysis to understand additionality. Specifically, we draw out the key challenges addressed by using a mix of methods plus applying each as outcomes materialise and the data about the outcomes mature:

- Initial methods focus on differencing over areas. This has the advantage that as projects progress, the data collected about housing supply can be collated at this level, such as planning applications, construction and completions, but a challenge is the selection of an area into HIF will correlate with drivers for housing construction.
- As houses are sold, much richer data allows the supply of new housing to be modelled within a wider set of housing characteristics; there will also be for the resale of existing houses. This allows more of the housing demand drivers to be included, but a challenge is that comparing areas assumes sharp discontinuity at boundaries correlated with policy.
- House sales data also facilitates dwelling level analysis. Recent studies have indicated how – within a supply/demand model – the full account of how policy enables increased supply and price impacts. A richer geographical detail then softens the sharper discontinuities approach, but a challenge is whether such instruments are valid for HIF.

However, it may not be necessary to wait for the building on sites to have fully completed in order to begin modelling the additionality of housing. During Phase 3 of the impact evaluation, it should be possible to use monitoring data on housing completions and other data sources (such as Land Registry records) to test if enough development has occurred for robust additionality modelling to be possible, by conducting power calculations to see what level of additionality would be discernible statistically using the housing completions sample available at Phase 3.

SPATIAL DIFFERENCING FOR THE COUNTERFACTUAL
In order to identify the causal effects of an intervention, area-based panel data at a fine spatial scale covering years before and after the intervention can often provide a starting point. This counterfactual analysis exploits discontinuities arising because the policies apply to specific areas. Then comparing changes in outcomes and impacts in supported areas to changes for neighbouring untreated areas is used to identify the causal effect of the policy. The approach can work because boundaries of treated areas are uncorrelated with any unobserved area characteristics that affect outcomes.

Gibbons et al. (2017)[19] estimate the impact of interventions supported by the Single Regeneration Budget using a "concentric rings" approach to identify the impact on employment and local unemployment rates. The use of neighbouring untreated areas as controls means that interpreting any treatment effect has to be careful to allow for displacement. The estimation approach estimates:

- Displacement using spatial differencing to neighbouring areas (A2a); and
- Deadweight by extending beyond this to understand what would have happened anyway (deadweight) selecting areas similar to the development area but unaffected by close proximity, approach A2b.

Analysis can also centre on areas of the country that are deemed comparable using some exogenous factor. A potential such factor is whether an area included a rejected HIF bid. The number of such projects is similar to the number that entered the co-design phase of the HIF, so providing a sample of comparable areas. Much of the data compiled for the counterfactual impact analysis will be national and so the locating of the rejected applicants would enable an analysis of the planning applications, house building and housing completions in these areas. There have been examples of analysis of the area level effects of a policy where rejected applicants were used to construct a synthetic counterfactual (suggested by Abadie and Gardeazabal, 2003[20]). Helmers and Overman (2016)[21] compared a runner-up in the location of a major scientific facility in terms of the innovation outcomes around the selected area.

The use of such spatial differencing techniques are relatively common for productivity policy evaluations. Amion (forthcoming) uses a similar approach to infer the impact of housing developments in a local area. Key to extending the approach beyond business productivity has been to develop a hedonic model for rings around the development. Box 2 describes the hedonic pricing method. This allows changes seen at different distances from the development to be estimated by weighting it by the characteristics of the housing mix in each ring. The analysis seeks to answer the question how the housing supply is changed at different distances from the development. A challenge is that the housing mix will be very different, and any measure of effects has to be "unit equivalent". To estimate this, the analysis models sale price in the different rings and what, if any, changes can be attributed to the development.

The eight-step approach includes using the postcode-level data and identifying appropriate concentric rings. Next, the average property price of each ring is constructed using the property weights and prices by type using data from the Land Registry price paid data. Then, housing stock valuation is constructed from the house stock numbers and median house price. The final step is the hedonic regression and displacement valuations. To convert the valuation of displacement into a unit equivalent, the Land Registry PPD Data is used to estimate the proportion of new properties in each ring. An issue with the area-base analysis remains what level.

[19] Gibbons, Stephen, Henry Overman and Matti Sarvimaki (2017) "The local economic impacts of regeneration projects: Evidence from UK's Single Regeneration Budget" VATT Working Paper 92.
[20] Abadie, A. and Gardeazabal, J. (2003). 'The economic costs of conflict: a case study of the basque country', American Economic Review, vol. 93(1), pp. 113–32.
[21] Helmers, C. and H. Overman (2016) "My Precious! The location and diffusion of scientific research: Evidence from the Synchrotron Diamond Light Source", 127(September).

The spatial differencing approaches have parallels with distance decay approaches used in evaluating the economic impacts of major transport schemes. Ipsos-MORI et al, 2019[22] suggest that the datasets available in the UK (covered in the next section) would make the approach viable for evaluators, where schemes are relatively so that impacts would be discernible. They take this view focusing on wider economic impacts of transport investments, such as housing impacts.

DWELLING LEVEL ANALYSIS AND INSTRUMENTING FOR THE COUNTERFACTUAL
UK evaluations of housing policies are increasingly using data on house sales, which includes information on dwelling characteristics and transaction prices and is at a very detailed geography (postcode). The main data source is the Land Registry Price Paid Dataset which details property transactions in England and Wales and records the transaction price, postcode, address, date of sale (transaction date), categorical data of dwelling type, tenure and whether the home was a new build. The scale of the data is key: there were 6.3 million transactions between 1995-2018 recorded in the data, of which 11% were new builds. Further, the data can be linked to the Energy Performance Certificate data at dwelling level, adding information on the floor area and other characteristics of newly built buildings.

The three papers below highlight the key counterfactual analyses that this rich data allows, all essentially only using administrative, accessible data. Studies can use the data in two impact measures:
- Houses completed in an area: As sales are coded about whether they are new build, the data provides every new dwelling and analysis usually aggregates for a small area to produce a panel.
- Price effects at dwelling level: Analysing sale price data can provide a robust assessment of the price and quantity trade off, i.e. how much house building rises versus price gains.

ITS (2019)[23] is an example of dwelling level analysis, essentially using a hedonic but focusing on the relationship between transport and land value. The study uses both cross sectional and time series models of residential properties. The impetus of the study is to test whether the introduction of the Northern Powerhouse Rail had an effect on property value and to therefore model this relationship and explore the potential land value uplift.

The pricing model of the residential property market has to be rich, using accessibility, place, building characteristics, socio-economic and demand-supply variables. The time-series model uses a case study approach of the recently upgraded Manchester Metrolink, incorporating a quasi-experimental approach to identify the impact of the new stations (treatment) on house prices. The study uses data at an LSOA level and found a land value increase of 6.3% per kilometre from the new stations. The authors discuss the large effect that new builds have on land value increase, as do potential labour supply improvements and agglomeration effects. It is indicative of the land value uplift attributable to accessibility improvements.

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[22] Ipsos MORI, Georhe Barrett and Tom Worsley (2019) "Economic performance impacts of road enhancements (EPIRE): preparatory work, final report", Report to DFT, September. https://www.gov.uk/government/publications/scoping-study-evaluating-economic-performance-impacts-of-road-enhancements

[23] ITS (2019) "Land Value and transport modelling and appraisal". Report to Transport for the North, West Yorks Combined Authority and EPSRC, August.

Further, recent studies have highlighted that robust evaluation, in the sense of a well-constructed counterfactual, is possible using an instrument (considered SMS level 4). Instruments induce changes in the explanatory variables but would not affect the dependent variable of interest. Such modelling is policy specific, with a challenge being supporting the applicability of any instrument by providing analysis that confirms it can be used. The data for the dwelling level approach is very detailed at a spatial level and so this approach is likely to make use of this feature. As well as the instruments used in past studies that use dwelling level data that are detailed below, some specifics for the HIF could be tested. For example, the border between authorities granting planning permission, or the planning designations of an area, may provide a geographical boundary that then combines with a policy change (such as a new local authority or Neighbourhood Plan) to allow the HIF impacts to be isolated.

BOX 2: HOUSE PRICE DATA AND HEDONICS

Hedonic price modelling, including the applications to house markets, has its theoretical foundation in Rosen (1974)[24]. The approach analyses prices of differentiated products or composite goods in terms objectively measured characteristics. So, for housing, the overall price would be made up of values attached to size, location, whether detached, etc. Transactions then attach value to these characteristics.

Econometric analysis can then be used to estimate the implicit prices for the different characteristics and, where datasets are large, the analysis can provide robust estimates of the effects of policies, either through the effect on a characteristic in the hedonic model (e.g. accessibility improvements) or through timings or location specificity of policy.

The sophistication of the hedonic model relies on the data about characteristics that is collected at dwelling level. ITS (2017) provides a comprehensive list. This covers data about accessibility, amenity value, physical building size and plot characteristics, neighbourhood factors. They also provide market demand and supply.

Carozzi et al. (2019)[25] use house prices to analyse the Help to Buy scheme (HtB), exploring the economic impacts of the scheme. The study estimates the causal impact of the Help to Buy Scheme on housing construction, house prices and the size of new builds. The spatial discontinuities in the generosity of HtB and timing of the implementations (9 months later in Wales and houses priced at <300,000 compared to <600,000 in England) allows identification of the causal impact and the study compares changes in house prices and purchases across the GLA border and English/Welsh border. Appendix 3 of this report indicates the estimations they perform, using datasets detailed in Appendix 2. Carozzi et al. analysis is robust and quantifies important impacts. They find that along the border of the Greater London area, the main effect was to increase prices of new builds just inside the area by about 5% (compared with new builds just outside the area), with no effect on construction volumes. On the English/Welsh border, where land supply is less constrained, there was some increase in construction volumes, but no effect on prices.

[24] Rosen, S. (1974). Hedonic prices and implicit markets: product differentiation in pure competition. Journal of Political Economy, 82(1), 34-55.

[25] Carozzi, Felipe, Christian Hilber and Xiaolun Yu (2019) "The economic impacts of Help to Buy". Mimeo

A further methodological improvement possible because of the geographical detail of transport accessibility indices. A transport accessibility calculates a journey weighted generalised travel cost for any location, producing estimates for very low geography. Gibbons et al (2019)[26] analyse the effects of the 1997-2007 strategic road programme, focusing on firm level decisions about location and employment growth. Ipsos-MORI et al (2019) recommend using accessibility modelling to provide a treatment measure having reviewed the Gibbon et al study, i.e. the change in accessibility due to a transport improvement. Such a measure then can support counterfactual impact evaluation.

Crucially the changes seen in accessibility provides a treatment variable that is not discrete. The risk with a discrete treatment variable is extracting a causal impact: roads may be built to meet demand in growing places, or vice- versa. Rather estimation uses the intensity of treatment (the change in accessibility induced by new road schemes), between wards, within the set zones near to the transport improvements. These are modelled estimates of treatment across an area. Accessibility indices across space instruments plausibly, being unrelated to location specific characteristics that would otherwise jointly influence new infrastructure placements and housing developments.

ITS (2019) also indicates a further useful metric that can be evaluated using house price data but where some accessibility change can be included in the house price hedonic model. There have been numerous studies that then use this to estimate the land value uplift attributable to accessibility improvements. To some extent, however, this literature is inconclusive about attribution aspects.

Qualitative interviews with Local Authorities and developers

As in the infrastructure delivery phase, qualitative interviews should be conducted with Local Authority FF teams and developers across all FF projects, in line with theory-based approaches employed in the evaluation. The purpose of interviews at this stage are:
- To assess the impact that new homes on FF sites have had on the local housing market. The assumption being tested here is that homes on FF sites are of higher quality and value than non-FF sites because they are well served by other amenities e.g. transport links, utilities, green spaces.
- To assess whether homes on FF sites are delivered at a faster pace than those not on FF sites due to the planning conditions and permissions already secured through involvement with the project. This will be assessed through counterfactual impact assessments using construction sector data as well (described above), but qualitative interviews with developers will be used to sense check quantitative findings.
- To support the analysis of Local Authority monitoring data described above. Interviews can explore any discrepancies between the number of homes, particularly affordable homes estimated and actually built at this point in the project, or any difficulties that Local Authorities have experienced in recovering profit from landowners and developers.

[26] Gibbons, Stephen, Teemu Lyytikainen, Henry Overman and Rosa Sanchis-Guarner (2019) "New road infrastructure: The effects on firms" Journal of Urban Economics 110 (2019): 35-50

Topics covered with Local Authority FF teams should include the perceived quality of the new homes built, including how well-served the properties are by local infrastructure such as transport, schools and other amenities. They should also include any differences in how planning applications or the building of homes on FF sites were progressed compared to typical developments on non-FF sites. It would also be useful to ask some more open questions about the respondents' impression of the local housing market and the extent to which the new homes delivered on FF sites have had an impact on demand or property values and in what way. The impacts of any significant contextual changes, such as the long-term impacts of COVID 19 on the delivery of homes should also be explored. All of these areas should be covered from the perspectives of both Local Authorities and developers, although the individual question wording will need to be adapted for each audience.

As in the previous phase, we suggest interviews with all FF Local Authorities and 10-15 develops, using the same criteria as before.

Longitudinal case studies

We also suggest this phase includes the second data collection point for the case studies, which we suggest largely mirror the previous wave in its design. While the focus of the case studies in the infrastructure delivery phase was to explore the impacts of the new infrastructure, the focus at this phase will be to gain insight on the quality of housing that has been developed and what, if any, impact the development of the new homes has had on the local housing market.

We suggest this element will again involve interviews with other Local Authority stakeholders (including the planning department) and focus groups with local residents, split by new residents living in homes delivered on FF sites and existing local residents (ideally some who took part in the first phase of data collection if possible).

It will be important to speak to members of the Local Authority planning department to get their view on the developments that have been and are being undertaken. The interview should include perceptions of the suitability of the housing developments, the extent to which new residents are supported by local infrastructure and any positive or negative impacts on existing residents. Other stakeholders interviewed will vary depending on the projects but might include, highways, parks, the environment, community safety and education. As before, we suggest approximately five interviews per case study, which can be adjusted by case study dependent on need.

Focus groups with local residents in this phase should include new residents living on FF sites. These focus groups focus on satisfaction with the new home and local community, reasons for purchasing (especially any aspects that attracted them to the local area) and their experience of the local area, services and transport. As a counter perspective, focus groups with existing residents will focus on impacts of the new housing developments for them, as well as any changes they have observed as a result of the new developments. This will also serve as an opportunity to check in again on the use of local infrastructure compared to the infrastructure delivery phase, to assess changes resulting from the increased homes built in the area. We suggest four focus groups per case study, two per resident type, allowing for a good demographic mix within each. Depending on resident numbers, it may also be possible to consider a resident survey for one or both of these groups, which could be scoped at the baseline phase.

As in the infrastructure delivery phase, the case studies should build upon the qualitative interviews being conducted with the Local Authority FF team and developers, with additional discussion areas covered in these interviews relating to the impact of the successes or failures of the local services to meet the demands of the new housing developments, and any secondary impacts that they have observed as a result of the FF, such as new developments leading to new commercial activity. Findings will be used to test the assumption that on FF sites with a placemaking element, the value and perceived quality of new and existing homes will have increased as the local infrastructure changes resulting from the Forward Fund lead to the creation or expansion of well-serviced communities.

Impact phase 4: Post-housing delivery

The aim of this final phase is to understand and evidence the longer-term housing outcomes from the FF, particularly those relating to communities where FF projects include a place-making aspect to their developments. It will culminate in the final evaluation report, integrating findings from final monitoring data, impact modelling and the longitudinal case studies.

Longitudinal case studies

This will be the final data collection point for the case studies. The focus at this phase will be to gain insight on combined impact of the infrastructure and housing investment on the communities as a whole. Findings will be used to draw conclusions as to whether the explicit intention of creating or expanding communities has had the intended impact, and how this compares to locations where the place-making element was less of a focus. Perceptions of whether the development of HIF homes have affected affordability of housing in the local area could also be explored through these case studies to supplement monitoring data given by Local Authorities on the number of affordable homes delivered.

As well as the methodologies recommended for previous case study waves (i.e. follow-up interviews with the wide range of Local Authority stakeholders approached in previous waves, HIF developers and residents' surveys and/or qualitative interviews) we would also recommend an ethnographic approach covering the experiences and perspectives of those involved in delivering the project and the community members. Ethnography can be used to reach a deeper understanding of context, in this case it would be valuable to visit the HIF communities and hear from the people involved (for example through a 'walk and talk' exercise[27]) how they experience the developments on a day to day basis in terms of factors such as access to services, use of green spaces, traffic, pollution etc. It would be valuable to compare the perspectives and intentions of designers / developers with the realities of the residents themselves.

The exact design of this is best determined at the outset of this phase, based on the findings from previous phases and the needs of the Department at that time.

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[27] Sage research methods publications (2018) Ethnographic Interviews: Walking as Method
http://methods.sagepub.com/base/download/DatasetStudentGuide/mobile-methods-memory-park

Local Authority data analysis

This phase will also include analysis of data collected by the Local Authorities across all phases of infrastructure and housing delivery, using this to showcase change in key statistics since the initial baseline and across the infrastructure and housing delivery.

Counterfactual modelling

HIF projects will have long-term impacts on housing markets and, while many early impacts on housing completions and sales may be observed soon after projects deliver, the investments are likely to initiate a pipeline of further housing developments. Further, the maturing of communities, with businesses, amenities and wider public infrastructure, may take several years to materialise.

At this post-housing delivery phase, evaluation approaches used in the earlier phases will be implemented again. The analysis over two periods will focus on the long-term trajectory of additional housing supply and this will allow some cross validation to explore the sustained impacts. This would also complement the qualitative aspects at this stage, potentially testing some of the more qualitative improvements in the housing developments in observed house price sales. Modelling will continue to be at low spatial levels, so that the effects on the wider housing markets beyond the sites would be explored.

7. Evaluation implementation and costs

Per conversations with MHCLG, there is a need to be pragmatic about when, how and by whom the HIF-FF is monitored and evaluated in the short and long term. There are elements of the recommended approach that should be conducted by an independent, external evaluator, whilst other aspects could be undertaken internally to minimise both burden and the cost to evaluate the Forward Fund.

The collection of key monitoring data can be done internally or by a commissioned evaluator. The evaluation requires data on key outputs such as funding spent, infrastructure completion and number of homes built, which would need to be provided by FF leads within Local Authorities. There is a data collection system being used by Homes England and MHCLG for their internal contract monitoring purposes and we therefore recommend that the same system should be used for the evaluation, in order to minimise the burden on Local Authorities and ensure that data is collected consistently and with support from central government. This data would then be provided to the external partner for reporting and impact assessment purposes.

However, if this information is not able to be shared with the evaluator, an excel tool has been created for Local Authorities to complete separately.

The counterfactual impact modelling could be conducted internally or externally, depending on the availability of internal expertise within MHCLG, however an external evaluator would provide the benefit of independence. An internal approach may offer necessary cost savings but should be carefully considered to ensure it can be conducted robustly and independently over multiple waves.

The external evaluation, encompassing ongoing qualitative research on outcomes and impact should be done by an external agency with the appropriate expertise, with the design for each laid out explicitly in impact phase 1 (baseline data collection and approach refinement) but reviewed at the onset of each subsequent phase to ensure the approach is still the most appropriate. External evaluation is required at each phase in the proposed evaluation, but to varying degrees and for different purposes, as outlined above.

Commissioning of external evaluation

The impact evaluation could be commissioned by phase, with the tasks per phase as outlined above. This would allow for budget changes over time – e.g. to adjust for inflation or changes to the requirements – that cannot be planned for at this early stage. It will also provide MHCLG with greater flexibility in partners over time, ensuring the most relevant partner(s) are used at each point. This would certainly be helpful given the inevitable refinements required following the review of the FF portfolio at the baselining phase. We recommend however that the baseline phase, and the infrastructure delivery phase (impact phases 1 and 2) are commissioned together to ensure continuity between activities at both phases, as approach refinement will include the evaluator building a detailed understanding of the projects and developing distinct Theories of Change for groups of projects. This will identify additional outcomes that different types of infrastructure are expected to deliver, which will shape the impact evaluation of the infrastructure delivery.

It is expected that both impact and process evaluations will need to work together to share insights over time, and it is assumed that the final evaluation report will need to bring all insights together, either via a partnership or one lead agency using the insights from all prior work. If process and impact were to be commissioned together, a sensible approach might be to commission process phases 1 and 2, and impact phases 1 and 2, as a single contract over the period to 2025, with the opportunity to review / extend further beyond that as desired.

Further detail on commissioning recommendations can be found in the Central Monitoring Framework document.

Evaluation cost scenarios

We have created costs for each phase of work proposed, with all elements outlined in the previous section. Table 7.2 provides the cost per phase and each element within this, including detail of what is included for each.

These are rough estimates based on the broad approach outlined here and will need updating at the baseline phase for the final approach, then at each subsequent phase to adjust for any approach and/or increased research rates due to inflation. For planning purposes, we suggest a buffer of +10% on these to allow for approach changes and/or increases based on the final scope required.

Table 7.2: cost scenarios for evaluation elements

Phase and Component	2020/21 cost excl. VAT	Cost with inflation
Impact phase 1: Baseline data collection and approach refinement (2021 for c. 6 months)		*Rates as of 2020 (no inflation)*
Evaluation scoping *Review 31 LA plans and timings, adjustment of evaluation plan (including identification of case studies) and creation of detailed timings leading to updated evaluation approach report.*	£10,000.00	£10,000.00
Data collection *Development of baseline and ongoing data collection tools for MHCLG/HE to use for data collection. Monitoring of baseline data collection by MHCLG/HE, acquisition and tabulation of data and secondary data analysis to establish baseline figures.*	£16,000.00	£16,000.00
Qualitative baseline: Local Authorities *90-minute telephone interviews with all 31 Local Authorities to get a baseline view of the local area, project plan and goals, and establish evaluation expectations/concerns. Cost includes recruitment, discussion guide design, moderation, write up and analysis.*	£22,000.00	£22,000.00
Baseline report *Use of qualitative interviews and baseline data analysis to develop baseline report outlining the current state of the nation, starting point for monitoring and overall objectives. Estimated 75 pages.*	£17,000.00	£17,000.00
Project management *Project inception meeting and management of the above (assumes 6 months to deliver) including weekly updates and bimonthly calls.*	£35,000.00	£35,000.00
Phase Total (excl VAT)	**£100,000.00**	**£100,000.00**
Impact phase 2: Infrastructure Delivery Phase (c. 2024/25)		*2020 rates + 12.5% inflation*
LA monitoring data *Provision of x5 days of support for MHCLG/HE in collecting ongoing data using tools designed during baseline phase; can be used however needed i.e. to check/update data needs and tools, provide QC, or general support/guidance. Assume 5 days over multiple years, plus time to acquire, QC and analyse the most recent data for reporting.*	£7,000.00	£8,000.00
Qualitative update: Local Authorities *Telephone interviews of up to one hour with all 31 Local Authorities to get firsthand accounts of progress, successes and challenges. Cost includes recruitment, discussion guide design, moderation, write up and analysis (to feed into report below).*	£23,000.00	£26,000.00
Qualitative interviews: property developers *Interviews with x15-20 developers working on HIF sites and others working in neighbouring areas to understand how HIF has changed the local development landscape. Cost includes recruitment, discussion guide design, moderation, write up and analysis (to feed into report below).*	£12,000.00	£13,000.00

Longitudinal case studies *Initial phase of interviews and site visits with x8-10 projects to showcase projects and their progress over time. Initial visits to include focus groups with local residents (x4 focus groups split by new/older residents and demographics) and project stakeholders (x15-20 depth interviews with other LA stakeholders, community organisations, etc.), with content included from LA interviews. Case studies will be presented in the below report and followed up twice more to demonstrate cases over time. Cost includes recruitment, discussion guide design, moderation, incentives, travel & subsistence, venue hire, write up and analysis (to feed into report below).*	£103,000.00	£120,000.00
Counterfactual and impact monitoring *Analysis of business cases and forecasting for successful and unsuccessful projects, workshopping of approaches to test and finalise CIE approach, establishment of baseline. Development of final approach report and revised technical notes.*	£66,000.00	£74,250.00
Interim Evaluation Report *HIF progress update report, using analysis of monitoring data, impact/counterfactual modelling, and qualitative interviews with LAs and developers to demonstrate progress against expected outcomes. Introduction of case studies and progress/impact to date. Estimated 75-100 pages for full analysis and case studies.*	£17,000.00	£19,000.00
Project design & management *Project inception meeting and management of the above over a multi-year period, including initial approach review, regular progress updates and calls. Assumes qualitative research and reporting happens within a 12-18 month period and 1-2 modeling updates to be managed across the multi-year phase.*	£55,000.00	£65,000.00
Phase Total (excl VAT)	**£277,000.00**	**£319,000.00**
Impact phase 3: housing delivery (c.2029/2030)		*2020 rates + 25% inflation*
LA monitoring data *Provision of x5 days of support for MHCLG/HE in collecting ongoing data using tools designed during baseline phase; can be used however needed i.e. to check/update data needs and tools, provide QC, or general support/guidance. Assume 5 days over multiple years, plus time to acquire, QC and analyse the most recent data for reporting.*	£7,000.00	£9,000.00
Qualitative update: Local Authorities *Telephone interviews of up to one hour with all 31 Local Authorities to get firsthand accounts of progress, successes and challenges. Cost includes recruitment, discussion guide design, moderation, write up and analysis (to feed into report below).*	£22,000.00	£30,000.00
Qualitative interviews: property developers *Interviews with x15-20 developers working on HIF sites and others working in neighbouring areas to understand how HIF has changed the local development landscape. Cost includes recruitment, discussion guide design, moderation, write up and analysis (to feed into report below).*	£11,000.00	£15,000.00

Longitudinal case studies *Initial phase of interviews and site visits with x8-10 projects to showcase projects and their progress over time. Initial visits to include focus groups with local residents (x4 focus groups split by new/older residents and demographics) and project stakeholders (x5 depth interviews with other LA stakeholders, community organisations, etc.), with content included from LA interviews. Case studies will be presented in the below report and followed up twice more to demonstrate cases over time.Cost includes recruitment, discussion guide design, moderation, incentives, travel & subsistence, venue hire, write up and analysis (to feed into report below).*	£105,000.00	£140,000.00
Counterfactual and impact monitoring *Renew data access, analysis and modelling for CIE 1, 2 and 3.*	£61,000.00	£81,000.00
Interim Evaluation Report *HIF progress update report, using analysis of monitoring data, impact/counterfactual modelling, and qualitative interviews with LAs and developers to demonstrate progress against expected outcomes. Introduction of case studies and progress/impact to date. Estimated 75-100 pages for full analysis and case studies.*	£17,000.00	£22,000.00
Project design & management *Project inception meeting and management of the above over a multi-year period, including initial approach review, regular progress updates and calls. Assumes qualitative research and reporting happens within a 12-18 month period and up to 1-2 modeling updates to be managed across the multi-year phase.*	£55,000.00	£75,000.00
Phase Total (excl VAT)	**£278,000.00**	**£372,000.00**
Impact phase 4: Post-housing delivery (2030+)		*2020 rates + 50% inflation*
LA monitoring data *Provision of x5 days of support for MHCLG/HE in collecting ongoing data using tools designed during baseline phase; can be used however needed i.e. to check/update data needs and tools, provide QC, or general support/guidance. Assume 5 days over multiple years, plus time to acquire, QC and analyse the most recent data for reporting.*	£7,000.00	£10,000.00
Longitudinal case studies *Initial phase of interviews and site visits with x8-10 projects to showcase projects and their progress over time. Method will need to be determined at the time, but we suggest inclusion of ethnography and potentially a resident survey. For costing, we have assumed a broadly similar budget to previous phases, covering site visits and qualitative research with LA FF teams, LA stakeholders, developers and focus groups with new/existing residents, to the same volumes as above. Case studies will be presented in the below report and followed up twice more to demonstrate cases over time. Cost includes recruitment, discussion guide design, moderation, incentives, travel & subsistence, venue hire, write up and analysis (to feed into report below).*	£140,000.00	£210,000.00
Counterfactual and impact monitoring *Renew data access, analysis and final modelling for CIE 1, 2 and 3.*	£61,000.00	£92,000.00

Final Evaluation Report *HIF progress update report, using analysis of monitoring data, impact/counterfactual modelling and qualitative interviews with LAs and developers to demonstrate progress against expected outcomes. Introduction of case studies and progress/impact to date. Estimated 75-100 pages for full analysis and case studies.*	£21,000.00	£32,000.00
Project design & management *Project inception meeting and management of the above over a multi-year period, including initial approach review, regular progress updates and calls. Assumes qualitative research and final reporting happens within a 6 month period and one final modelling update across the multi-year phase.*	£37,000.00	£55,500.00
Phase Total (excl VAT)	**£266,000.00**	**£399,000.00**
Total cost of external evaluation **(excl VAT, incl. 2.5% annual inflation)**	**£921,000.00**	**£1,190,000.00**

These costs assume the following:
- Baseline costs use current market rates, whilst future phases assume a c. 2.5% increase in rates annually in line with inflation then very roughly extrapolated across years to provide a ballpark cost for future waves of work. These are based on the approximate timings as outlined in previous sections.

- Costs assume full set up and management for all phases, allowing for new agencies to take over specific components as needed and thus no cost savings from repeat work. This includes a review/update of the approach at each wave, which should be done in partnership with the lead evaluator.

- Budget assumes Local Authority data collection and monitoring, and that from any public sources, will be managed by MHCLG or Homes England, with minimal input from the evaluator. However, due to the reliance of the evaluation on this data, budget dues include 5 days of consultancy per phase of work to support internal data monitoring and collection. This is based on a need to review/rephrase the data requirements at the start of each phase (when the first project enters the phase) and troubleshooting at intervals thereafter. Costs also allow for analysis of output and outcome data vs. the baseline in each phase, for inclusion in reporting alongside impact modelling. The cost of conducting traffic surveys for road projects where data is not gathered by third parties such as Highways England, are estimated to be approximately £5,000 per project; based on conducting traffic surveys at five junctions around a single road improvement. We typically recommend five surveys to cover nearby points and to test routing around a road improvement, however the total number of surveys required per project will vary significantly depending on the size and complexity of the road improvement, and if a project involves improvements on more than one site. These costs have not been included in the above budget as the number of projects requiring traffic surveys will be confirmed at the baselining phase.

- All phases include budget for full reports (75-150 pages depending on phase), but do not include cost for presentations nor any provision of qualitative recordings or transcriptions.

Appendix 1: Forward Fund evaluation framework

Outputs

Output	Time Period	Activity	Indicator	Provider	Data to provide	Notes
Output 1: Funding Drawdown	Short term	Infrastructure work underway	Funding is received according to expected timelines	LA monitoring reports / Homes England MI data	Dates and amounts of funding drawn	This will allow HE/MHCLG to monitor delays on infrastructure delivery
			Infrastructure work commences to expected timelines and scope	LA monitoring reports	Reports on status of infrastructure work	This will allow HE/MHCLG to monitor delays on infrastructure delivery
		Additional funds secured	Funding is available for full infrastructure projects	LA monitoring reports	Confirmation that funds have been made available	
Output 2: Infrastructure Delivered	Medium term	Infrastructure is completed	Infrastructure work is completed as planned	LA monitoring reports	Evidence of completion of infrastructure	
			Scheme costs are in line with estimates given in FF bids	LA monitoring reports	Scheme costs and commentary where there are discrepancies with estimated costs	Allows MHCLG/HE to check for an optimism bias in scheme costs which will impact on cost benefit analysis
Output 3: Additional housing completed	Output 3: Additional* housing completed	Housing planning permission granted	Planning permission is granted for expected housing developments on FF sites estimated in bids	LA monitoring reports	Reports evidencing planning permissions given	
	Medium / Long Term	Additional* homes being built on HIF sites (housing starts)	Homes are delivered in line with estimated timescales in FF bids	LA monitoring reports	Reports on housebuilding figures on FF sites	Allows MHCLG/HE to compare estimated timescales for anticipated homes built estimated in bids, with actual delivery. NB it will not be clear from this measure that homes started are 'additional'.
	Long term	Additional* homes are delivered	Homes are completed in line with estimated timescales in FF bids	LA monitoring reports	Reports on housebuilding figures on FF sites	As above

*Additionality of homes will be estimated by the counterfactual impact evaluation, which will take place at scheduled points over the project timeline. This calculation will incorporate gross homes built net of displacement and 'deadweight' (homes expected to be built regardless of the FF funding).

Outcomes

Outcome type		Outcome	Evaluation element	Indicators	Data source / access	Counter factual option	Timing of measurable impact	Phase of primary data collection / review of secondary data	MHCLG Priority (Essential / medium priority / low priority)	Comment e.g.geographic boundaries of indicators & house level / detailed geography level
Housing	Short term	Changing land use - improved efficiency	Counterfactual impact modelling - Land Value Uplift calculation (see accompanying technical mote for more information)	Infrastructure changes lead to additional land value uplift on FF sites in line with estimates in FF bids	Land Registry Price Paid Dataset and Energy Performance Certificate data	Yes	12-18 mths after infrastructure is completed	Impact phase 3: Housing delivery	Medium	
Housing	Medium term	Creation of new / expansion of existing communities	Primary research with LAs, developers, homeowners	New facilities and amenities beyond housing are developed on FF sites which contribute to a sense of community e.g. green spaces, schools, commercial activity	Data gathered by central evaluator	No	5 years after first housing completions	Impact phase 4: Post-housing delivery	Low priority	This may not be evident in all projects. Some projects included a 'placemaking' element whereas others focused more narrowly on solving an infrastructure need. Case study research to include both types of bid.
Housing	Medium term	Reduced risk in housing market stimulates developers	Primary research with LAs, developers	Increased confidence, reduced perception of risk to developers in house building in FF areas	Data gathered by central evaluator	No	At completion of infrastructure	Impact phase 2: Infrastructure delivery	Low priority	
	Medium term	Influence on local housing market via saturation or driving demand	Counterfactual impact modelling - hedonic modelling (see accompanying technical note for further information)	The value of homes on HIF sites changes compared to no HIF because of i. new local supply, and ii. provision of new infrastructure, with welfare improvements	Housing Completions data/ ONS House Price Index via Homes England	Yes	12-18 mths after infrastructure is completed	Impact phase 3: Housing delivery (allowing 2x12-18 months for both housing to be delivered	Essential	The impact that the FF and additional supply of housing might have on house prices is unknown and subject to different influences (e.g. better amenities causing prices to increase vs increases supply potentially causing a decrease / slowing) therefore the impact evaluation will estimate change to the driving forces behind prices

Outcome type			Evaluation element	Indicators	Data source / access	Counter factual option	Timing of measurable impact	Phase of primary data collection / review of secondary data	MHCLG Priority (Essential / medium priority / low priority)	Comment e.g.geographic boundaries of indicators & house level / detailed geography level
				reflected in property values.				and datasets to be compiled)		through hedonic modelling. Additionality modelling could be supplemented by this approach - if the evaluation on additionality identified is different to that assumed in the bid appraisal (e.g. lower), the next stage could be to consider whether HIF led to general welfare improvements through other means, with the improvement reflected in estimated changes in property values.
			Primary research with LAs (planning depts), developers, residents	Homes on FF sites are of higher quality and value than non FF sites because they are well served by other amenities e.g. transport links, amenities, green spaces	Data gathered by central evaluator	No	12-18 mths after infrastructure is completed	Impact phase 3: Housing delivery	Medium	This may not be evident in all projects. Some projects included a 'placemaking' element which is expected to increase value in the local area where others focused more narrowly on solving an infrastructure need. Case study research to include both types of bid.
Housing	Medium term	Mitigation of affordability issues	Secondary analysis of LA output data	Amount of affordable housing delivered is in line with proportions estimated in FF bids	LA FF delivery team	No	Ongoing from 12-18 mths after infrastructure is completed	Impact phase 3: Housing delivery & Impact phase 4: Post-housing delivery	Essential	
	Long term		Primary research with LAs (LAs, developers)	Perceptions of whether HIF homes have affected affordability of local housing supply in any way (either positively or negatively)	Data gathered by central evaluator	No	5 years after first housing completions	Impact phase 4: Post-housing delivery	Low	
Housing	Long term	Recycling of housing income from HIF sites	Secondary analysis of LA monitoring data,	Profit recovered by LAs from developers and land owners on	LA FF monitoring data / data gathered by central evaluator	No	Ongoing from 3 yrs after completion	Impact phase 3: Housing delivery &	Essential	The Local framework will require specifics around the recovery, including whether upper tier or

Outcome type		Outcome	Evaluation element	Indicators	Data source / access	Counter factual option	Timing of measurable impact	Phase of primary data collection / review of secondary data	MHCLG Priority (Essential / medium priority / low priority)	Comment e.g.geographic boundaries of indicators & house level / detailed geography level
		supports further housing development in a local area	supported by primary research with LAs	FF sites in line with recovery plans			of infrastructure	Impact phase 4: Post-housing delivery		combined authority, and what funding constitutes recovery.
				Increased spending by LA on housing development in the LA		No	Ongoing after profit is recovered from developers	Impact phase 3: Housing delivery & Impact phase 4: Post-housing delivery	Essential	LAs may vary in how quickly they plan to spend recovered funds, therefore data may need to be a qualitative statement of their plans for recovery
Infrastructure	Short term	Changing land use - improved efficiency	Counterfactual impact modelling - Land Value Uplift calculation (see accompanying technical mote for more information)	Infrastructure changes lead to additional land value uplift on FF sites in line with estimates in FF bids	Land Registry Price Paid Dataset and Energy Performance Certificate data	Yes	Estimated on completion of infrastructure, validated after significant housing completions	Impact phase 2: Infrastructure delivery and again at Impact phase 3: Housing delivery	Medium	
Infrastructure	Medium term	Change in local use of infrastructure	Secondary analysis of data gathered by LAs (either from LA's MI data, LA primary collection or existing datasets)	TRANSPORT: Changes in travel times (positive and negative) in the corridors of interest, including analysis of the difference between outturn results and scheme forecasts at route level.	Dependent on projects (i.e. scale, location and transport mode) - possibly ONS, DFT and LA data	Pre / post	Baseline collected before infra work commences, follow up expected immediately / one year after completion of infrastructure depending on infra type	Impact phase 1: Baseline data collection and approach refinement and Impact phase 2: Infrastructure delivery	Medium	Routes to be measured should include all modes (rail / road / other) that may be affected by new infra. Data should also be accompanied by a narrative of any other transport funding / initiatives in the area that could impact routes identified in FF projects.
			Secondary analysis of data gathered by LAs (either	TRANSPORT: Increased choice of modes for journeys, and improved choice	Dependent on projects (i.e. scale, location and transport	As above	Baseline collected before infra work	Impact phase 1: Baseline data	Medium	This may not be applicable to all transport projects, e.g. some projects may only intend to improve the current road

Outcome type		Outcome	Evaluation element	Indicators	Data source / access	Counter factual option	Timing of measurable impact	Phase of primary data collection / review of secondary data	MHCLG Priority (Essential / medium priority / low priority)	Comment e.g.geographic boundaries of indicators & house level / detailed geography level
			from LA's MI data, LA primary collection or existing datasets)	of accessibility, indicated through changes in traffic flows in corridors of interest, patronage of public transport systems in the area (e.g. bus/tram passenger flows) and counts of pedestrians. This should include analysis of the difference between outturn results and scheme forecasts at route level if given in projects.	mode) - possibly ONS, DFT and LA data		commences, follow up expected immediately / one year after completion of infrastructure depending on infra type	collection and approach refinement and Impact phase 2: Infrastructure delivery		network, with no new modes becoming available.
			Secondary analysis of data gathered by LAs (either from LA's MI data, LA primary collection or existing datasets)	TRANSPORT: Reduction in variability of travel times (to indicate increased reliability) in the corridors of interest, including analysis of the difference between outturn results and scheme forecasts at route level if given in projects.	Dependent on projects (i.e. scale, location and transport mode) - possibly ONS, DFT and LA data	As above	Baseline collected before infra work commences, follow up expected immediately / one year after completion of infrastructure depending on infra type	Impact phase 1: Baseline data collection and approach refinement and Impact phase 2: Infrastructure delivery	Medium	Routes to be measured should align with routes identified in bids. Data should also be accompanied by a narrative of any other transport funding / initiatives in the area that could impact routes identified in FF bids.
			Secondary analysis of data gathered by LAs	FLOOD DEFENCES: Pre-existing households in surrounding area benefit from reduced risk of flooding	Environment Agency / flood risk assessment specialists	N/A	At completion of infrastructure	Impact phase 2: Infrastructure delivery	Medium/Low depending on bid	Where projects have stated that they will provide these particular types of infrastructure (flood defences, green spaces, schools, GP surgeries, utilities, reduced amenity impacts) as the infrastructure for which Forward Funding is being given, then the respective indicator is of 'medium' priority.
			Primary research with LAs	GREEN SPACES: Pre-existing households benefit from use of additional green spaces / amenities	Data collected by central evaluator	Pre / post	At completion of infrastructure	Impact phase 2: Infrastructure delivery	Medium/Low depending on bid	

Outcome type		Outcome	Evaluation element	Indicators	Data source / access	Counter factual option	Timing of measurable impact	Phase of primary data collection / review of secondary data	MHCLG Priority (Essential / medium priority / low priority)	Comment e.g.geographic boundaries of indicators & house level / detailed geography level
			Secondary analysis of LA-collected data	SCHOOLS: increased capacity in schools and choice for parents	LA data analysed by central evaluator	N/A	At completion of infrastructure	Impact phase 2: Infrastructure delivery	Medium/Low depending on bid	Where projects do not state that funding will be spent directly on these particular types of infrastructure (flood defences, green spaces, schools, GP surgeries, utilities, reduced amenity impacts), but have a 'place-making element' to them, i.e. they have the explicit objective of delivering well-planned communities to support new homes and Forward Funding may therefore lead to additional infrastructure being delivered above their core infrastructure ask, these indicators may also need to be measured but will be of a 'low' priority. In these cases indicators could be measured through conducting case studies rather than collecting quanititative data.

For 'Other - reduced amenity impacts..' only: Some work is being done in MHCLG around trying to estimate this using a WTP survey. |
			Secondary analysis of LA-collected data	GP SURGERIES: increased capacity at GP surgeries / increased choice of surgeries for patients	NHS England / LAs	N/A	At completion of infrastructure	Impact phase 2: Infrastructure delivery	Medium/Low depending on bid	
			LA updates on infrastructure delivery	UTILITIES: further development sites potentially unlocked by provision of new utility facilities	LA FF monitoring data	N/A	At completion of infrastructure	Impact phase 2: Infrastructure delivery	Medium/Low depending on bid	
			LA updates on infrastructure delivery	OTHER: reduced amenity impacts from remediating poor quality land or land with blight	LA FF monitoring data	N/A	At completion of infrastructure	Impact phase 2: Infrastructure delivery	Medium/Low depending on bid	
Infrastructure	Medium term	Improved access to services via expansion / creation of infrastructure	As above for 'Changes in local use of infrastructure'	As above for 'Changes in local use of infrastructure'	As above	N/A	As above	As above	Medium	This will only apply to projects with a 'place-making' element, (where improved access to services can be expected) and it will be measured using the same indicators as those used above to measure 'changes in local use of infrastructure'.
Infrastructure	Medium term	Changes in existing property	Counterfactual impact modelling (see accompanying	Increase in property values of existing housing on and around FF sites due	Land Registry Price Paid Dataset	Yes	12-18 mths after infrastructur	Impact phase 3: Housing delivery	Low	These indicators should measure the knock on effects to property and land value that FF investment may bring that are

Outcome type	Outcome	Evaluation element	Indicators	Data source / access	Counter factual option	Timing of measurable impact	Phase of primary data collection / review of secondary data	MHCLG Priority (Essential / medium priority / low priority)	Comment e.g.geographic boundaries of indicators & house level / detailed geography level
	values, and land values	technical mote for more information)	to improvements in infrastructure			e is completed			not directly linked to FF sites and therefore not captured by the bid estimates.
			Additional homes are built in areas surrounding HIF sites (not included in projects) as a result of FF	Various - see Technical note	Yes	12-18 mths after infrastructure is completed	Impact phase 3: Housing delivery	Low	
			New commercial spaces are developed on HIF sites and surrounding areas (not included in bid estimates) as a result of FF	Land Registry Price Paid Dataset and Energy Performance Certificate data	Possible	12-18 mths after infrastructure is completed	Impact phase 3: Housing delivery	Low	
Infrastructure	Long term	Actioning of long-term sustainable transport plans (in some cases)	Primary Research with LAs	LA's long term transport plans achieved	LA FF delivery team / DFT	N/A	Dependent on period of transport plans	Dependent on period of transport plans	Essential	
Infrastructure	Long term	Improved function of communities (infrastructure not overstretched)	As above for 'Changes in local use of infrastructure', also to be covered in primary research - case studies	As above for 'Changes in local use of infrastructure'	As above	As above	As above	As above	Low	This will be measured using the same indicators as those used above to measure 'changes in local use of infrastructure' and will apply to all projects to confirm whether infrastructure adequately supports the demands of new housing, therefore satisfying the rationale for HIF funding.
Unintended	Medium term	Housing displacement location shift	Counterfactual impact modelling (see accompanying technical mote for more information)	Additionality modelling and primary research shows displacement rather than additional houses being built	For counterfactual modelling, see technical note for data sources / data gathered by central evaluation team	Yes	12-18 mths after infrastructure is completed	Impact phase 2: Infrastructure delivery & Impact phase 3: Housing delivery	Essential	These unintended consequences of the bid will be measured through the counterfactual's estimations of displaced housebuilding. We suggest supplementing the model with primary research e.g. case studies with developers to support the estimates.
Unintended	Medium term	Increased developer concentration		Developers move activity to FF sites away from other non-FF locations					

Outcome type		Outcome	Evaluation element	Indicators	Data source / access	Counter factual option	Timing of measurable impact	Phase of primary data collection / review of secondary data	MHCLG Priority (Essential / medium priority / low priority)	Comment e.g.geographic boundaries of indicators & house level / detailed geography level
Unintended	Medium term	Housing displacement labour		Demand for labour in house-building falls in non-FF locations						

Appendix 2: Data available for the evaluation

Key to the evaluation scoping is understanding the data available, particularly to track impacts and outcomes. For this purpose, data typically has to be collected over time (so that effects can be determined before/after the intervention) and ideally in a consistent manner across both supported housing developments and comparable unsupported areas/developments. This latter characteristic of data – comparability across locations – facilitates the development of a counterfactual.

The main body of the report introduces many of the key datasets that we expect to use in the impact evaluation. This appendix describes the data that would be collected centrally for the evaluation, separately looking at data about housing supply, both in terms of the stages as dwellings are completed and the data about house sales after completion. The appendix also covers some infrastructure datasets that are available at a national level and further detail about why these series are considered suitable. Broadly each series is viewed as suitable because data is collected over time before/after the intervention and in a consistent manner across both supported housing developments and comparable unsupported areas/developments. This section describes the datasets and the basis for that finding. Some DFT analytical datasets are also introduced, and there are some questions about their use in this study, especially whether TEMPRO and NTM model runs might be useful/practical as part of the FF impact evaluation. This appendix does not include the main local level data collections (such as traffic counts), which would be the focus of the local monitoring systems.

Housing supply and tracking changes

A first set of data needed for the evaluation is the measures of housing supply. Core has been the datasets that are part of the Local Authority Housing Statistics Data. The 'Housing Supply and Net Additional Dwellings' provides the most comprehensive estimates of new housing supply and is able to track changes in dwellings and dwelling size due to new builds, conversions, changes of use and demolitions (MHCLG 2019a[28]). One component – published separately as a release 'House Building: new build dwellings statistics' collection – estimates house building and provides National Statistics on house building starts and completions; released quarterly (MHCLG 2020a[29]).

This section considers both the data as house building is completed and early indicators that house building is on track, with this latter dataset allowing early analysis of gross levels of new housing. A key early indicator is planning applications as developers seek approval for housing schemes and data linked to this administrative source by construction sector intelligence (see further detail on construction sector intelligence data in Box 3). This underlies the National Statistics on planning applications received and decided, including decisions on applications for residential developments (dwellings) and enforcement activities. Data are provided at national and local planning authority level and are based on information reported quarterly.

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[28] MHCLG 2019a, 'Housing Supply: net additional dwellings', https://www.gov.uk/government/collections/net-supply-of-housing
[29] *MHCLG 2020a, House Building: new build dwellings statistics',* https://www.gov.uk/government/collections/house-building-statistics

Early predictors of housing completions

As housing is completed, its certification provides a definitive administrative source. However, this occurs at the end of a – potentially – quite long process. Any earlier evidence that house building is on track could then support earlier impact analysis. The key administrative data for this is through the planning processes and then commercial databases about whether individual developments are progressing through procurement and delivery as planned. Such data is collected over time before/after the intervention and in a consistent manner across both supported housing developments and comparable unsupported areas/developments.

The planning application process is run through online portals, allowing applicants to upload documents as they apply, then the planning authorities to consult the public and other bodies, and then recording decisions. After planning consent is granted, the developer has three years to use the consent but as it takes a minimal level of construction activity to begin a development, after consent there is relatively little that can be said about the progress of a development through administrative sources.

As outlined in the box below, one example of construction sector intelligence data begins with the planning application data scraped from the different planning authorities (such as each local authority and the Planning Inspectorate). The data then undergoes a number of data augmentation activities, focusing firstly on structuring the planning application data by developments tying individual applications into one development. The main users of the data are the construction industry and this data structuring facilitates data products, including characterising developments in terms of the various procurement strands a developer would follow. The data is then augmented by linking to data about the various contractors involved in the project (architects, builders, etc).

Perhaps, most relevant to this study is that the data provider also tracks the performance of the projects through surveying developers. There is a "On hold/Shelved" indicator, which the MHCLG currently uses as an indicator of whether housing plans are likely to be delivered. Based on MHCLG use, the prior is that this provides a good indicator of whether housing will be built, potentially well ahead of the completion date. For the impact evaluation, such evidence will be most valuable in a relative sense, whether the HIF supported projects are performing better or worse than plans expected in comparison to other developments.

BOX 3: EXAMPLE OF CONSTRUCTION SECTOR INTELLIGENCE: GLENIGAN CONSTRUCTION INDUSTRY INSIGHT DATA

Underlying some national statistics is data from the commercial provider Glenigan[30]. Glenigan provides comprehensive construction sales data for the UK. This data contains information on project name, value, location, planning state for example "detail plans granted" or "planning not required". Key variables also include the anticipated housing expected from each project.

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[30] For example, the quarterly release "Planning Applications in England" reports Glenigan data for the number of planning applications granted; also on https://opendatacommunities.org/home

The Glenigan focus on insight means that real-time information about the project status is maintained. This is gained through a mixture of continuous collection from planning authorities, especially the documentation as applications progress which is accessible through online planning portals run by planning authorities. Glenigan then also contacts developers by phone, to collect details about the progress on each project particularly after consent has been given.

Information is available about the contract stage, i.e "start on site" or "contract awarded, tenders returned". A Glenigan field also gives whether the project status is "in progress" or "on hold/shelved". This is an important variable, used by MHCLG in statistical analysis as an indicator of whether – after consent – a housing development is on track to deliver houses.

The Glenigan data maintains a time-series dimension, allowing users to consider the live, archived or specific projects and gives an option to sort the data by client name, contract stage, contract type, end date, project name, last update, planning stage, project status, starts date and value (all in alphabetical or numerical order). Linking the planning data to HIF projects is relatively straightforward as the data carefully aggregates planning applications for development projects, as it has multiple layers to the data allowing views by developer and development.

A key question about such data is how quickly it is updated from sources other than the real time administrative sources. A small sample study was completed of 40 of the largest value projects from the Glenigan data with the project status of "On Hold/Shelved" in order to assess the predictability and timeliness of the data. This was done in early April and so that 17 of these projects were recorded on hold due to COVID-19 suggests that project status updates are timely, and certainly quick enough to be considered timely for an impact evaluation. The analysis also looked at publicly available data about the projects (their sales websites, news stories), which was not as up-to-date suggesting that Glenigan calling developers or integrating a wider set of data is providing timeliness across the whole construction sector.

Building completions data

Building completion is a further statistical dataset. Underpinning the National Statistics release is a quarterly data collection from building control officers, at the National House Building Council, Local Authorities and Approved Inspectors. Such data is collected over time before/after the intervention and in a consistent manner across both supported housing developments and comparable unsupported areas/developments.

The raw data underpinning the local authority returns is increasingly becoming accessible. Homes England has developed a tool that compiles the individual building control certificates in a geographical information system and links this to Land Registry sales data and EPC certificates. The Housing Completions Model (HCM)[31] is a powerful tool assisting Home England staff through an interactive map allowing users to view the number and

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[31] Homes England (2019) "Housing Completions Model", Published October 2019.

timing of completions at different geographical levels, so that the recording of completed housing stock can be tracked after the signing off of a dwelling has been certified.

Homes England are continuously developing the tool and have tested its ability to replicate the official statistics. As the data source (building control certifications) is common to both the tool and statistics, there is a good correlation between the HCM and returns made to MHCLG from local authorities, NHBC and Approved Inspectors. However, it is generally recognised that the underlying data does require some additional detail to be collected, such as certification is generally for a block of student accommodation and not for individual accommodation units. Homes England have identified that urban areas, where accommodation types are prevalent that are less likely to be one dwelling in one structure, have most measurement differences.

For housing affordability, the 'Affordable Housing Supply' data collection provides the most complete estimate (MHCLG 2019b[32]). Affordable housing includes social rented, affordable rented and intermediate housing, provided to specific eligible households. The statistics are published annually for England and show the gross annual supply of affordable homes. Both Homes England and the Greater London Authority (GLA) provide these statistics. HE publishes data twice per year which reports on housing delivered through its programmes, whereas the MHCLG's statistics aim to provide a complete picture on affordable housing, irrespective of the funding mechanism. The GLA publishes the data on the starts and completions of affordable housing.

Administrative data and housing sales

Many impacts of the HIF will be on the effects on the housing market, especially the market in areas near to the infrastructure investments. One specific analysis that provides a range of datasets about housing quality is the studies of house price inflation. The analysis employs data about individual houses, modelling house prices in terms of characteristics focusing on houses that have been sold recently. Administrative sources associated with house sale can be used in the evaluation, as they are collected over time before/after the intervention and in a consistent manner across both supported housing developments and comparable unsupported areas/developments.

The main sources of the data for England are the HM Land Registry, which records sale price after a sale completes. Alongside price, the record includes the date of the completed sale, full address details, the type of property and whether or not it is a new build and if the property was purchased through finance. In discussions, other data sources – such as the mortgage related data from the Regulated Mortgage Survey (RMS) – includes detailed transaction-level data on mortgage completions. This includes data on purchase price, completion date of property sale, type of borrower (first time buyer or home mover) new or second-hand property, type and size of dwelling. However, generally the advantages of this source – it is very timely – is more a need for constructing a house price index. Land registration data's lag would not be a problem for evaluation purposes, and a key benefit of HM Land Registry data is its completeness covering all house sale transactions.

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[32] *MHCLG 2019b, 'Affordable Housing Supply',* https://www.gov.uk/government/collections/affordable-housing-supply

Augmenting the data with further characteristics at house level has been through link to the Energy Performance of Buildings Certificates. This provides information on the energy performance and efficiency of new and existing houses and can also be used as an early indicator of new housing supply (MHCLG 2020b[33] & MHCLG 2019c[34]). The data contained within the certificates include average energy efficiency ratings, energy use, carbon dioxide emissions and fuel cost, average floor area and numbers of certificates recorded.

A hedonic is constructed modelling price on a range of characteristics. The property attributes data from Land Registry and RMS sources is augmented using the Valuation Office Agency Valuation list and the Acorn Classification, segmenting postcodes into categories and groups for the analysis of significant social factors and behaviours.

Other datasets

Relevant analyses to our knowledge are: MHCLG Indices of Multiple Deprivation and the Department for Transport's national trip-end modelling (NTEM/TEMPRO) and National Transport Model. Many of these datasets have been augmented by the HIF project teams. Each are examples of a government analysis that draws together a number of datasets for the entire country, at detailed geography, and for many years with a strong desire for consistency. They each have a housing component, utilising key datasets (such as the Census, English Housing Survey, etc.) The IMD is data intensive analysis, drawing together many measures at a household level (though reporting at a neighbourhood level). Some points from each are worth noting. NTEM/TEMPRO forecasts underpin the assessments of VFM for HIF funded transport projects. Further, when three modelling reports for HIF projects were reviewed, TEMPRO data had been augmented by local authority housing and other development plans, so that the transport modelling integrated the evidence about non-HIF developments. These have been modelled in terms of the likelihood of the developments to materialise (using the TAG Unit M4[35]). The generation of trips by households as they commute, shop, etc is modelled in the various scenarios for the proposed housing developments in the context of wider sets of planned developments to understand the need for infrastructure to unlock land for housing. Validating whether the demand forecasts used at appraisal stage are accurate could form a start for an ex post evaluation.

TEMPRO forecasts are applied to a GB multimodal model using the National Transport Model. The Model can be used to provide ward level accessibility data and, if the model Is run with and without the HIF funded transport interventions, provide the changes in accessibility due to HIF. Such a set of model runs underpin the Gibbons et al. (2019) analysis of the effects of the DFT strategic roads targeted programme of investments on firm-level productivity. Ipsos-MORI et al (2019) have reviewed evaluation approaches for major transport schemes, building on the dataset underpinning Gibbons et al. looking across a portfolio of schemes that extend to 2017 and include local majors. They arrive at a list of about 200 schemes that are large enough in scale to individually have localised

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[33] *MHCLG 2020b 'Live table on Energy Performance of Buildings Certificates',* https://www.gov.uk/government/statistical-data-sets/live-tables-on-energy-performance-of-buildings-certificates
[34] MHCLG 2019c 'Housing Supply; net additional dwellings, England: 2018-19, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/850825/Housing_Supply_England_2018-19.pdf

[35] DFT (2019) "TAG Unit M4: Forecasting and Uncertainty: Forecasting and Uncertainty", www.gov.uk

economic impacts discernible when analysis is undertaken at a national level. Broadly, the scale of the road improvements (costs of around £50m) are in line with the HIF projects announced in the HIF Forward Fund, though much larger than the Marginal Viability projects.

Appendix 3: Econometric estimation of impacts

The counterfactual impact evaluation methods rely on relatively new and novel methods, that have been developed recently capitalising on the improved datasets available, covered in appendix 2. The modelling approaches used in a recent UK housing policy are described in Carozzi et al (2019), which integrates results from Hilber and Vermeulen (2016)[36]. The two studies outline the underlying economics of how government support for housing can translate into both increased supply and changes in house prices.

In estimating housing supply and price effects, the estimation progresses in three steps, with the final considering how the approach may be used for HIF (rather than the focus on Help to Buy of Carozzi et al.):

- Compiling a rich area- and transaction-based dataset;

- Estimating supply and price effects of the policy; and

- Attributing impacts to the policy.

Compiling datasets

The detail of the datasets allows statistically powerful analysis either at the level of individual house sales (which is transaction level) or at a geographical level (such as at lower super output areas). In estimating the impacts of Help to Buy, Carozzi et al. (2019) compile a transaction level dataset to understand the price effects of policies; they use a ward-level dataset to model the housing supply focusing on new construction. In addition, the datasets available to characterise the housing market are diverse, with a degree of flexibility available in constructing variables to use in empirical modelling. Recent work has – for example – catalogued different aspects about the amenity of an area.

Table A3.1 indicates the variables that may be used in the modelling, splitting between the variables associated with places, especially the accessibility and amenity of an area, and socioeconomic and housing supply drivers in local areas. Also, there are variables relating to each home.

Some variables require a main data source but then some additional data or modelling to create analytical variables. So, for example, the access to employment variables constructed in ITS (2019) calculate how many jobs there are in the vicinity of an area, but does this using a gravity model that effectively weights more distance to job centres in terms of travel costs less that proximate jobs. This uses the detailed ONS employment statistics combined with travel costs data by different modes of transport.

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[36]Hilber, C. A., & Vermeulen, W. (2016). The impact of supply constraints on house prices in England. Economic Journal, 126(591), 358-405.

Supply constraints are quantified using variables at area level, such as the share of land in a designation (e.g. Green Belt), average planning application refusal rates, share of developed land indicating urban nature as well as topological aspects such as indicators of hilliness. As there is likely an inter-relatedness of housing supply, house prices and the planning processes – in econometric terms, there is endogeneity – the study integrates results from Hilber and Vermeulen, using instruments proposed there to avoid endogeneity. For example, rather than using refusal rates, Hilber and Vermeulen note a policy change in 2004 provides a proxy correlated with a planning authorities' likelihood of refusing applications but unaffected by the consequent change in applications.

Table A3.1: Potential variables to model house sale prices

Category	Variable	Data Source/Modelling	
Accessibility to employment Generalised cost weighted employment centring on location	Rail accessibility	Passenger Demand Forecasting Handbook	Access to ONS small area statistics and/or firm-level employment
	Walk accessibility to jobs	Open/OS/Other maps with employment ONS small area statistics	
	Car accessibility to jobs	TrafficMaster data/NTM with employment ONS small area statistics	
Place quality	School quality	Ofsted ratings for nearest schools	Distance based weighting
	Accessibility to parks and gardens	MasterMap Greenspace Layer	
	Accessibility to local centres, Landfill Sites	MasterMap Sites Layer	
	Air quality	Defra Pollution Climate Mapping	
	Road noise exposure	Defra strategic noise mapping	
	Crime		
Building attributes	Postcode, address	HM Land Registry Price Paid Dataset	
	Price paid		
	Date of sale		
	Tenure		
	Number of bedrooms	MHCLG Energy Performance Certificates	
	Number of bathrooms		
	Floor area		
	Energy efficiency		
	Type (e.g. (Semi-) Detached, terraces, flats	HM Land Registry Price Paid Dataset	
	New build/Property Age		
Income Housing market	Area equivalised annual income	ONS Small Area Estimates	

Housing market	Income-squared	
	Housing supply growth	Various measures detailed in annex
	Land by planning designations	OS Boundary Line
	Planning applications refusal rate	MHCLG Planning Application Statistics
	Topography of area	OS MasterMap

*Table primarily derived from ITS (2019) and Carozzi et al (2019)

Estimating supply and demand effects

Carozzi has focused on Help to Buy, a policy to ease borrowing constraints on home buyers, the approach can form the basis for evaluating a wider set of policies. A strength of the analysis is its identification strategy, as the study focuses on the housing markets at the boundaries between regions of England and Wales, recognising material policy differences between London, the rest of England and Wales. Using the differences at boundaries make the evaluation results more robust.

There are some differences when applying to HIF. The identification strategy here would be the different intensity of accessibility changes following a transport improvement. This, while not being a policy discontinuity at an administrative boundary as with Help to Buy, does provide a treatment variable that is unlikely to be endogenous. For HIF, a first focus is the new builds, extracting the effect of HIF on new builds:

$New\ builds_{jt} = \omega_j + \delta_t + \beta HIF_{jt} \times f(\text{distance from site})$

The modelling is conducted using area-level datasets, focusing on the numbers of houses built in area j at time t. The modelling then includes some area specific data (ω),) such as indicated in Table A3.1, effects over time (δ), but then develops an estimate in terms of effects controlling for proximity to the infrastructure improvement, as the observed transactions of new build units is available at different distances to the policy intervention before and after the policy. The degree of sophistication about the distance modelling can be varied, with the accessibility index approach approximating to the change in generalised cost of travel due to transport improvements. Further, such modelling could include in area specific data (ω), information about areas that applied to HIF but were unsuccessful, simply identifying these areas and considering any impact differential in comparison to these areas or undertaking more sophisticated analysis.

The modelling then focuses on prices, p, for individual houses (i) over time (t) estimating:

$P_{it} = \phi_l + \delta_t + \gamma'Xit + \beta HIF \times f(\text{distance from site})$

This is essentially a hedonic in terms of location effects (ϕ), effects over time (δ) and characteristics of the house (X), but then introducing the policy. The policy impact on prices is the complement to the new build effects, exploring the extent to which infrastructure improvements result in price changes.

Attribution to policy

Both the evaluation of Help to Buy and the Hilber and Vermeulen study of supply constraints use econometric modelling to estimate the responsiveness of housing supply and how house price changes provide corroborating evidence about supply constraints. The justification for HIF funding has been to reduce the chance of planning systems refusing permissions to build houses. It achieves this through funding complementary necessary investments and so enhancing the supply. The two studies then point to ways to quantify the extent to which this policy aim has been met.

In evaluating HIF FF, the ability to determine whether investments have improved housing supply could use the estimation models above to account for the scale of the housing supply, whether price changes are consistent with the housing supply being additional and identifying whether there are effects beyond the immediate developments. Further, an approach would test that housing is supplied and that house price rises are consistent with a more elastic supply in the area as HIF investments reduce barriers to developments.

From past studies, there is sufficient data both at transaction and area levels to explore these dynamics in the housing market. Further, the Hilber and Vermeulen work provides instruments that can be used to ensure analysis takes proper account of the endogeneity in some of the key variables about housing supply constraints. Help to Buy has been innovative in a number of ways. As well as having a strong identification strategy using policy discontinuities at administrative boundaries, the study also then uses its impact estimates to provide a more detailed account of impacts. As Help to Buy was a financial instrument and the analysis has considerable evidence about the value of house purchases, they can estimate rates of return, explore the profitability of developers and begin to account for the costs and benefits of the policy.

A key part of the econometric studies has been testing the strengths and weaknesses of methods. Robustness tests and addressing the challenges of endogeneity will be needed to be able to provide evidence of effects attributable to HIF.

Table A3.1 indicates the variables that may be used in the modelling, splitting between the variables associated with places, especially the accessibility and amenity of an area, and socioeconomic and housing supply drivers in local areas. Also, there are variables relating to each home.

Some variables require a main data source but then some additional data or modelling to create analytical variables. So, for example, the access to employment variables constructed in ITS (2019) calculate how many jobs there are in the vicinity of an area, but does this using a gravity model that effectively weights more distance to job centres in terms of travel costs less that proximate jobs. This uses the detailed ONS employment statistics combined with travel costs data by different modes of transport.

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	Air quality	Defra Pollution Climate Mapping	
	Road noise exposure	Defra strategic noise mapping	
	Crime		
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	Tenure		
	Number of bedrooms	MHCLG Energy Performance Certificates	
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	Type (e.g. (Semi-) Detached, terraces, flats	HM Land Registry Price Paid Dataset	
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Income Housing market	Area equivalised annual income	ONS Small Area Estimates	
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	Land by planning designations	OS Boundary Line	
	Planning applications refusal rate	MHCLG Planning Application Statistics	

*Table primarily derived from ITS(2019) and Carozzi et al (2019)

Appendix 4: Approaches considered for assessing impact

Our recommended approach to assess impacts incorporates three methods – which produces increasing robustness over time – and mixes them over the three analysis phases of the evaluation. The study also considered some alternative methods, assessing some as unsuitable for the evaluation. Determining whether approaches could provide robust impact measures was in terms of:

- Applicability to the policy. As past research was considered, approaches used to understand additional impacts were often tailored to the policy and this criterion considered if HIF shared features of other policies allowing an approach to be used

- Data collection needs. A feature of this evaluation scoping was its exhaustive review of different data sources and this supported the use of some methods. Where there are data gaps to apply particular methods, these can rule out approaches.

- Likelihood of the approach to attributing impacts accurately and in a timely manner. To some extent, this is a statistical issue, relating to statistical power and whether sufficient accurate data is available, the numbers of observations over projects and time, the potential to identify comparisons and an element of judgement (given the complexity and multiple outcomes of HIF projects).

Table A4.1: Approaches considered assessed but not recommended

Approach	Description	Assessment
Regression discontinuity	Determine a discontinuity that provides a counterfactual such as the HIF applicants that were near-misses or developments on either side of a geographical boundary	HIF, as a policy, does not have a geographical discontinuity (such as is the variation at the London boundary in Help to Buy); further the co-development phase made successful applicants materially different to rejected proposals blurring the discontinuity at rejection. However, some tracking of the rejected applicants is proposed in the study.
Depth studies of rejected applicants	Tracking the performance of the applicants to HIF that were unsuccessful exploring whether infrastructure investment proceeded or whether housing developments have occurred without support.	Depth evidence gathering about the rejected applicants, tracking the housing outcomes of areas that did not succeed in receiving HIF support was considered overly burdensome. However, some tracking of the rejected applicants is proposed in the study
Large-scale household surveys		Surveys of households as a means to understand impacts was not found to be a common approach in impact evaluations of housing development policies and infrastructure-focussed policies. Likely issues are attribution being difficult with comparators across time and location difficult.