Department for Levelling Up,
Housing & Communities

Exploring the potential effects of the proposed Infrastructure Levy

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Foreword

This report was commissioned by the Department of Levelling-Up, Housing and Communities in 2021. The modelling undertaken in the report is based on the initial design for the proposed Infrastructure Levy as at the date this research was commissioned.

The government commissioned this work to build a further understanding of the potential impacts of a reformed system of developer contributions. Applying the initial design of the Levy to real-world scenarios, in partnership with local authorities, has been an important step in recognising both the benefits of the new Levy as well as the associated challenges of a reform of this scale. A key outcome of this research, therefore, has been the decision by the government to pursue a 'test and learn' approach to introducing the Levy. This will support local authorities to set rates and minimum thresholds effectively, to deliver the benefits of this approach.

The government thanks the University of Liverpool and partners for producing this report. The report was conducted by researchers with extensive experience in studying this subject area. The conclusions and analysis have been an important source of information for developing the further design of the Levy. The technical consultation on the Levy can be found here, and those interested in the findings of this report should also consider reviewing and responding to that consultation.

When reading this report, as is emphasised by its authors, it is important to recognise that the Levy rates and minimum thresholds used in the research are for illustrative purposes only. The possible windows for feasible rates that would collect more value, while keeping development viable, were devised for the purposes of the case studies. That is why, in some cases, the range of values that the Levy could take is wide ranging.

As explained in the technical consultation on the Infrastructure Levy, local planning authorities will need to take a balanced approach to how they set Levy rates and minimum thresholds, considering in the first instance the value of developer contributions they would be able to secure now as a baseline. LPAs will then need to consider whether they will be able to collect more from the new system, whilst still keeping development viable and enabling land to come forward for development.

The Department is committed to research and evidence building to underpin policy development. It will continue to develop its evidence base for the Infrastructure Levy. This will include consultation, and the potential for further research.

Stephen Aldridge

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Background

The proposal for an Infrastructure Levy (IL) set out in the 2020 White Paper, *Planning for the Future*, is conceptually distinct from the existing system by which developer contributions are currently exacted in England. As a sales tax on gross development income, as opposed to a cost-based mitigation measure, the IL potentially represents a more geographically consistent and comprehensive approach than the current system that variously combines planning obligations, such as Section 106 agreements (S106), the Community Infrastructure Levy (CIL) and, in London, Mayoral CIL. However, the proposed change in system also represents a fundamental shift in how developer contributions are conceived and will require a different approach (and different data) if local authorities are to successfully determine their own locally specific IL charging schedules.

In this study we set out to provide insights into how a locally determined Infrastructure Levy might be developed and work in practice. To achieve this aim we worked with six local authorities from a diverse range of development contexts across England to produce illustrative models of hypothetical development. In producing model outcomes, we used an initial specification document prepared by DLUHC to establish the fundamental principles of how the IL might work in practice. Taking this approach allowed us to provide evidence on four specific areas regarding the Infrastructure Levy's potential operation that were specified in the project brief:

i. **Creating an IL charging schedule and evaluating the process**

   The proposed Infrastructure Levy is conceived to be locally determined, locally levied, and locally spent. This will require local authorities to determine several locally specific levy rates and a threshold (below which the IL will not apply) for the IL, which will be consistent with the twin objectives of not compromising development viability whilst simultaneously raising a scale of funding for infrastructure and affordable homes that is not less than has been historically provided through S106 and CIL. To achieve this objective, we have worked with 6 local authorities to produce a prototype IL charging schedule for each.

ii. **Evaluating the possible proceeds of the IL and its implications for affordable housing provision**

   In this study we set out to provide evidence on the value of developer contributions that might in principle be exacted under the proposed Infrastructure Levy and explore any effects of a change in the system on the provision of affordable housing.

iii. **Comparing the IL to the prevailing system of S106 and CIL**

   The case for the proposed Infrastructure Levy is a comparative one: a core criterion for its implementation turns on how it compares to the extant system. By comparing the prevailing system with the proposed IL across a range of development types we establish evidence on how the two systems compare across a range of indicators. For example, we present data on the proportion of the uplift in land values resulting from the award of planning consent that would be recovered through both systems and the overall scale of developer contributions exacted under the existing and proposed IL systems.

iv. Understanding potential responses to the IL

The terms of the proposed IL may prompt different behavioural responses from both local authorities and the development industry. We seek to present evidence on how both may respond to the IL.

Acknowledgements

We are grateful to the planning officers who supported this research through collating records, sharing their experiences, and providing detailed answers to often complex questions.

We also wish to thank the team at the Department for Levelling-up, Housing and Communities who were responsible for commissioning this research, in particular Laurence Martindale, Sam Deaner, Ralph Andre, Kieran Tang, Kris Patel, and Tom Simpson. We are also grateful to those at DLUHC who commented on the research methods and findings.

Finally, this report is dedicated to the memory of our friend and colleague, Professor John Henneberry, who was to have been a member of the research team and had worked on this issue for many decades but who passed away very shortly before the commencement of this project.

About the research team

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Executive summary

ES.1 This study provides evidence on the potential operation of the Infrastructure Levy (henceforth, IL). The IL was proposed in the White Paper, *Planning for our Future* (MHCLG, 2020) and has been designed by the Department for Levelling-Up, Housing and Communities. The findings presented in this document are premised on the initial conception of the IL as set out in a specification document shared by DLUHC with the research team in September 2021. The research team had subsequent briefings with DLUHC on how the IL proposals were being developed which are discussed in the policy analysis in Chapter 2 but were not taken into account in the modelling work.

ES.2 In order to achieve the study's aim, two types of work were undertaken. Firstly, the potential impacts of the IL were modelled across a range of indicative development types. Secondly, insights from local authority officers were solicited regarding how the IL might be implemented and incorporated into broader planning practice.

ES.3 The modelling work contained in the document provides intelligence on the range of rates that the IL might theoretically take in each of 24 hypothetical developments across six real-world local authority case studies. A full account of model outcomes is presented in Appendix 1 to this document. Chapter 3 presents an analysis and discussion of the principal findings from this modelling work.

ES.4. Chapter 4 reports on qualitative findings from our work with the six case study local authorities on the practical challenges associated with implementing the IL before the concluding Chapter 5 summarises findings and poses a series of questions for policy makers to reflect upon.

ES.5 In this opening executive summary we set out to provide a synopsis of the principal findings of the research.

Modelling the performance of the Infrastructure Levy

ES.6 This research reports modelling of 24 hypothetical development types in six real-world local authority case studies (4 development models per local authority). The results of this modelling work are discussed and analysed in Chapter 3 and the full report of all modelling work is contained in Appendix 1 to this document.

ES.7 In discussing the findings of the modelling work it is first essential to understand the terms under which the levy is conceived as operating. Throughout this document the IL is applied to the difference between a minimum threshold and the sales revenue achieved on new development. Both the minimum threshold and the specific IL rate to which a development would be subject would be locally determined. The minimum threshold would comprise the main (non-land) construction-related development costs (base build costs, site preparation costs, costs of external works, professional fees, and contingency allowance). The Existing Use Value of land would also be included in the calculation of the minimum threshold. In the modelling these values are expressed in terms of £/m² of sellable space developed. It is also important to stress that the modelling involves making many assumptions which are set out in Chapter 2.

ES.8 On the basis of this understanding of the value to which the IL would be applied we present a range of measures to assess the potential impacts of the introduction of a locally determined IL. Perhaps the most salient of these reported measures is the establishment of estimated lower and upper bounds for the rates that the IL might theoretically take relative to each development model. The estimated lower bound describes the IL rate that would be equivalent to the scale of developer contributions that would follow under the policy-compliant implementation of the existing system. The estimated upper bound is defined as the maximum rate at which the IL could be set whilst maintaining benchmark land value and a 15% internal rate of return (IRR) to the developer. These boundaries should be understood within the context of the caveats discussed in Chapter 2's account of the modelling principles and process.

ES.9 Establishing an estimated lower and upper bound for the IL in each development type effectively describes a 'window' of rates at which the IL might, given our assumptions theoretically, be set locally. Our analysis of this concept of the IL window contained in Chapter 3 and Appendix 1 points to four distinct categories of development:

i. Development models that demonstrate a 'wide' IL window. In these cases, local authorities may have significant flexibility in determining a rate between the estimated lower and upper bounds.

ii. Development models that demonstrate a 'narrow' IL window. In these cases, local discretion over model outputs may be quite constrained.

iii. The 'new' window - development models that would previously have been outside the system of developer contributions, but which would become liable under the proposed IL.

iv. Development models that are not viable under either the existing system or the proposed IL. In these circumstances this results in the anomaly of the estimated lower bound for the IL (which represents the policy-compliant existing system) being greater than the estimated upper bound rate that the IL could take. There are four such examples where this 'negative window' can be identified. This includes the one example where the estimated upper bound for the IL is zero implying that no developer contributions could be secured on such a site.

ES.10 Considering each of these four distinct categories of development in turn:

The 'wide' window

ES.11 In some instances the range of values that IL could take is very wide. The most extreme example of this is Model E2 where there are 62 percentage points between the estimated lower and upper bounds (25% - 87%). In total, ten of the 24 developments modelled have a window of more than 50 percentage points between the lower and upper bounds (A1, B1, B4, C1, D1, D4, E1, E2, E3, F1).

ES.12 The majority of these developments where the IL window is 'wide' are greenfield residential developments.

ES.13 In these greenfield settings the principal determinant of viability appears to be existing property prices: the greater the value of the existing residential market the higher the estimated upper bound of a consistently wide window of potential IL rates. Similarly, and conversely, as existing property prices decline the narrower the window of modelled values the IL could take becomes.

ES.14 The balance of findings presented in this report would support the view that the IL is well suited to securing developer contributions in greenfield settings, particularly where existing property prices are strong.

The 'narrow' IL window

ES.15 The models with the smallest differences between the estimated lower and upper bounds were brownfield developments. Local authorities requested fewer brownfield developments to be modelled than greenfield. One of the reasons that local authorities gave for prioritising greenfield modelling was the perception that higher receipts are routinely achieved on greenfield sites in comparison to brownfield under the existing system.

ES.16 Two of the six case study authorities, A and B, requested modelling work for explicitly brownfield residential schemes (A2, A3, B2, B3) plus an office-to-residential scheme delivered under permitted development rights (A4) and a purpose-built student accommodation scheme (B4). These last two schemes would both be implicitly inner urban, brownfield developments. However, A4 and B4 are considered separately below as they represent development types that would be effectively partly or wholly outside the existing system of developer contributions.

ES.17 The key message from the brownfield sites is that the window of values that defines the viable rates at which the IL might be potentially set is far more constrained.

ES.18 In the highest value brownfield setting, A2, the window of values that the IL could take is sufficiently wide to afford local policy makers discretion over the IL rate that might be considered appropriate. By contrast, in relatively weaker housing markets, such as A3, the window of values that the IL might take is significantly narrowed. Local policy makers would correspondingly be far more constrained in their discretion over the determination of the IL rate. Cases such as A3, and more so in lower property price contexts, suggest the limited option of setting an IL rate that is close to simply maintaining existing outcomes (with the significant assumption that current local outcomes are genuinely policy-compliant).

ES.19 A significant reason for the more limited potential for developer contributions in brownfield settings (under any system) are the higher costs associated with property development in such contexts. For each m² of new space developed, high density projects on brownfield sites tend to have significantly higher non-land development costs compared to low density schemes. This is because:

- the sites typically have existing or previous commercial uses and their Existing Use Values tend to be higher.
- brownfield sites tend to be more complex with higher build costs.
- the presence of internal common areas requires a greater area to be constructed than is available to be sold.
- revenues tend to be received only after construction of the whole scheme is completed.

ES.20 For the reasons outlined above, the IL window in the modelled brownfield contexts is generally narrower than in greenfield settings.

ES.21 The conclusion of this finding is clear: the scope for developer contributions to be exacted on residential brownfield sites is constrained to higher value settings. It should be noted that this conclusion is equally true of the existing system as it is of the modelled IL. As real estate values decline, the scope for local authorities to manage the IL flexibly diminishes; only values close to the existing system's policy-compliant level of required contributions are consistent with development viability in brownfield sites characterised by lower values.

The "new window": development that was previously outside the system of developer contributions

ES.22 Brownfield and greenfield residential development jointly account for 19 of the models (15 greenfield, four brownfield). The remaining five models are comprised of three warehouse developments (D4, E4 and F4), an office-to-residential permitted development (PD) rights scheme (A3) and purpose-built student accommodation (B4). Considering each in turn:

ES.23 **Permitted development**. Model A4 is an office-to-residential scheme that would be delivered under permitted development rights. As this scheme would effectively be outside the scope of the existing system of developer contributions the lower bound that would be equivalent to the existing system is equal to zero. However, the upper bound level implies that the estimated maximum level at which the IL could be viably set is just 8%. This very narrow window of possibility for the IL, illustrated in Figure 3.5, results from the significant scale of the conversion costs associated with development of this type. This finding, again, reinforces the limited scope for developer contributions to be exacted in brownfield settings.

ES.24 The implication of the modelling is that the potential to capture value from PD schemes of this nature is quite limited. Whilst conversion costs will be highly variable depending upon the specific development, they are often quite significant and, when combined with higher existing use values relative to greenfield developments, the minimum threshold is correspondingly relatively higher than it would be for greenfield residential development. For this reason, only very modest rates of IL would be viable - a rate of 8% in our modelled example.

ES.25 **Student accommodation**. Model B4 provides an account of a brownfield purpose-built student accommodation development. These developments have been very popular over the past decade and have become a consistent feature of new development in many university towns and cities. However, the current system performs relatively poorly regarding capturing developer contributions from developments of this type.

ES.26 The model for this development indicates a wide potential window for the IL between an estimated lower bound of 9% and an estimated upper bound of 67%.

ES.27 The principal explanation for the magnitude of the difference between the rate that would be equivalent to the policy-compliant existing system and the potentially upper bound value that the IL might take lies in the terms of the two systems by which developer contributions might be exacted. The existing system is biased towards affordable housing contributions exacted through S106. As student accommodation cannot include on-site affordable housing, most of the value capture occurs through CIL – assuming that the local authority is a CIL-charging authority (as Case Study B is). If the local authority in question was not a CIL charging authority it is conceivable that even less would have been exacted through the existing system of exacting developer contributions.

ES.28 **Warehousing**. Another very popular development type over the past decade has been the emergence of large distribution and logistics facilities. As a non-residential use class these warehouses do not regularly attract developer contributions as they do not make affordable housing contributions and are often either explicitly exempted from CIL or located in lower value settings where CIL charging is comparatively low. The net result of these two observations is that, under the modelling assumptions, the existing system recovers no developer contributions in these models.

ES.29 Case Studies D, E and F all include modelled outcomes for greenfield warehouse developments that show that the IL as modelled would be viable at rates up to 24% in two cases (E4 and F4) and up to 54% in D4. All three cases record a lower bound of 0% as this type of development is effectively outside the scope of the existing system by which developer contributions are collected.

ES.30 Model findings suggest that this important category of development may be more effectively covered by the IL than the existing system. The range of possible values that the IL could take is relatively wide and strongly dependent upon general real estate values: the principal explanation for the significantly higher upper bound in model D4 relative to E4 and F4 is the presence of stronger market values.

The 'negative' window: are policy compliant outcomes always achieved?

ES.31 In four cases (B2, B3, D3 and F3) the range of values that the IL could take is negative: i.e., the upper bound (the maximum value at which the IL could be set) is below the lower bound (the IL rate equivalent to the policy-compliant, existing system). The existence of a negative window in these four cases represents an anomaly.

ES.32 The implication of a negative window is that the estimated maximum levy rate that could be applied appears to be lower than the scale of developer contributions that would be exacted under the locally policy-compliant implementation of the existing system. The most likely explanation for this outcome is that the scale of developer contributions under the existing system that would be required under the terms of local policy could not be realistically achieved in practice.

ES.33 Should local authorities deviate from policy compliant outcomes the effective value that would be recovered in practice under the existing system would be below the estimated lower bound. One way that developer contributions may be revised downwards in practice would be for the result of S106 negotiations to result in the provision of affordable housing at below policy-compliant levels.

Under what circumstances does the IL have the greatest potential?

ES.34 The analysis contained in this report points to the potential for the IL to provide local authorities with a potentially flexible tool to manage developer contributions that may have greater potential under some conditions than others.

ES.35 The aggregate of findings presented in this report illustrates that the IL is likely to perform best on uncomplicated greenfield sites in higher value settings. The width of the IL 'window' in these contexts would theoretically provide local authorities with considerable flexibility to achieve developer contributions at, or potentially above, the levels that would be entailed under a policy-compliant implementation of the existing system.

ES.36 The IL would also potentially bring developments into scope for developer contributions policies that have previously been effectively outside the existing system. Good examples of this type of development can be found in purpose-build student accommodation (model B4) and warehousing (models D4, E4 and F4).

ES.37 However, in other contexts, particularly brownfield developments, the IL window narrows, offering local authorities far less flexibility in the identification of a rate that would maintain development viability. In contexts where existing real estate values are low, and costs are high – such as many brownfield sites in the midlands and north – it does not appear that the IL would be more likely to capture greater value than the existing system. Testing the potential variabilities in how the IL might operate in different development contexts may usefully be explored through real world, local/regional trials.

ES.38 By way of a final set of conclusions it should be noted that the estimated lower and upper bounds that define the IL window are estimates predicated on some important assumptions.

ES.39 First, the lower bound's synchronisation with a policy-compliant version of the existing system is an idealised version of the results of S106 and CIL in operation: some local authorities may routinely not achieve policy compliant outcomes. In instances where local authorities are in practice currently achieving lower levels of developer contribution than modelled, understanding the rationale and context for this practice will be crucial to understanding the true lower bound that the IL might take.

ES.40 Second, the upper bound provides an estimate of the maximum value the IL could take whilst preserving development viability and the Benchmark Land Value (BLV) which includes the commonly applied concept of a 25% premium to existing use value to incentivise land release. However, there is very little research on the degree to which BLV represents an adequate incentive for landowners to release land for development: should BLV be an underestimate the upper bound for the IL would correspondingly be lower. This is one reason why the IL window should not be taken as a definitive statement of what may be practically 'available' - the estimated upper bound may not be an achievable maximum as it may require fundamental changes in landowner and developer behaviour (and expectations) that are themselves geographically variable.

ES.41 In practice it would be at the discretion of local authorities to determine rates for IL that they assess to be appropriate across the local authority area. This represents a range of practical challenges that would be devolved to the IL setting authority. These challenges were explored through the qualitative research reported in Chapter 4 and are summarised below.

Are LPAs well-prepared to institute the process by which the IL is set?

ES.42 Determining the operation of the IL will represent different challenges for different local authorities. The results of the qualitative component of this research, reported in Chapter 4, highlight six key areas where local authority interviewees described practical questions that would need to be answered in parallel to the implementation of the IL:

Would the IL require the collection of new data and the commissioning of new viability studies?

ES.43 For many CIL charging authorities there exist extensive viability studies from the relatively recent past that provide some insights into the local development context. For authorities of this type establishing a minimum threshold and an IL rate can be partly informed by the process and data presented in such studies.

ES.44 Amongst non-CIL charging authorities, which comprise just under half of all local authorities in England, a process of data collection will be an essential first step in determining a minimum threshold and IL rate for a specific area. This can be a lengthy process and most local authorities that have implemented CIL have felt the need to commission the types of local viability studies described above. It may be likely that this process would be repeated amongst non-CIL charging authorities.

ES.45 However, in all case study local authorities, both CIL and non-CIL charging, it was clear that local authorities would need very clear guidance about the process by which the IL and the minimum threshold should be set. This in turn would demand clear definitions of some of the essential inputs to the modelling process discussed in Chapter 3 and in Appendix 1 in this document – for example, how should the return to the developer be defined and computed, what are realistic measures for benchmark land value. It is possible that, even with clear definitions from central government, local authorities may require additional training and support to implement the IL given its degree of departure from the existing system.

How many IL zones will be required?

ES.46 A relevant question for local authorities pertains to the number of zones with varying levy rates/minimum thresholds that would need to be set.

ES.47 With virtually no exception, English local authorities contain a wide variety of land and real estate markets. This characteristic is clearly present in the six case studies upon which we focus in this study. The local authorities with which we worked reported that, for the IL to work efficiently, it may be necessary for local authorities to establish several different rates attuned to market circumstances and the prevailing character of the development planned for each area. Under the current plan-making framework all rates for the IL that operated within a local authority area would need to be set out in the relevant local plan and tested through the formal process that governs plan adoption.

How might the IL be used to govern development outcomes?

ES.48 Some local authorities reported anxieties that the IL could become a proxy for inter-authority competition.

ES.49 It is conceivable that pro-development authorities could use modelling work such as that reported in Chapter 3 to establish levy rates that are 'low', to encourage greater development in their area – possibly encouraging migration from one LPA area to another. Similarly, in other local authorities where there are local concerns about over-development the IL could be used defensively to set rates that could deter development.

ES.50 Previous research (Lord et al., 2018, 2020) has suggested that developers are more ready to migrate from one LPA to another in weaker markets where their market power is potentially greater. However, further research on this would be necessary to fully explore the inter-LPA effects of variable rates.

Would the IL deliver sufficient affordable housing?

ES.51 In Chapter 3 and Appendix 1 to this document the scale of affordable housing delivered under the modelled versions of the existing systems and the IL is held constant to support meaningful comparisons.

ES.52 Of the six local authorities with which we engaged in this project all were wholly supportive of the principle that the IL should be used to support the delivery of an equivalent or greater number of affordable dwellings than has historically been achieved under the existing system.

ES.53 However, one concern with this principle voiced by some local authorities was that negotiation regarding the tenure and dwelling type within this broad category of 'affordable housing' would require negotiation between the LPA and the developer in question. Some interviewees, therefore, questioned the degree to which the IL would genuinely reduce the need for LPA-developer negotiation.

How would the IL be collected?

ES.54 The IL is intended to operate in a similar fashion to CIL, as a local land charge, but collected in a different way. CIL is set at the point of granting planning permission, but IL would be liable on the final value of the development. This results in several different permutations for how the IL might be collected in comparison to the current system.

ES.55 First, there is upside risk for the local authority. If the value of the development increases, for example through an increase in prices across the housing market, it would follow that IL receipts could correspondingly increase. There are clearly potential benefits to local authorities from such an eventuality but verifying the sales value from a scheme would entail administrative demands: either local authorities would need to monitor the final value of development or developers would need to report this information to the local authority in question.

ES.56 Second, there are potential downside risks to the local authority. For example, if the value of a development decreases there could be a corresponding diminution in IL receipts. Under such circumstances it is conceivable that this may result in shortfalls to planned expenditure which may result in delays to projects funded by IL receipts and/or shortfalls having to be underwritten by a local authority, particularly if local infrastructure is perceived to be needed by a local community. Some interviewees were concerned that local authorities may not be able to fund the required infrastructure at the appropriate time.

ES.57 Some interviewees argued that the potential down-side risk of lower IL receipts than anticipated could make financial planning for infrastructure investments more difficult. This mirrored concern that the timing of IL receipts may be highly variable as the levy would depend on the completion of development. This approach would contrast with the implementation of S106 and CIL which are generally paid on commencement, although staged payments are also possible under the existing system.

ES.58 Third, as there is the potential for significant changes in the value of potential IL between the indicative levy liability undertaken at the point of planning permission and the final valuation of the development, there was concern amongst the case study LPAs about how this might be monitored and evaluated. One issue was that the LPA would have to undertake ongoing analysis about whether it was in the public interest to ask for a re-valuation of the development, which would require resourcing on behalf of the LPA.

Spending the levy: would the IL sever the connection with the site of development?

ES.59 Some local authorities argued that the proposed IL represented a conceptual shift in how developer contributions policies are implemented that is in tension with the terms of the broader discretionary planning system.

ES.60 The use of S106 agreements entails a clear connection between the site of development and the return of developer contributions to that site. The exaction of developer contributions in this way has a conceptual integrity with the terms of discretionary planning system where all applications for planning consent are understood as unique and evaluated individually.

ES.61 By contrast with the existing system the IL, like CIL, would raise revenue. However, a common criticism of CIL is that it has been successful at raising revenues that local authorities have subsequently aggregated and not spent (Property Week, 2021). Of course, this may be part of an overall strategy within local authorities to deploy several years of CIL receipts at a future time in the delivery of major infrastructure projects. Nevertheless, the potential remains for periods of time to elapse between the completion of a development and the subsequent investment of IL proceeds generated by that development.

Evaluating the IL proposal

ES.62 The aggregate of research findings contained in this study provides some insights into the proposed IL's potential performance on hypothetical development types across a diverse set of local authorities. However, to fully establish the potential of the proposed system, answers to several additional questions would be helpful.

ES.63 Firstly, the IL could bring more development into scope for developer contributions than the existing system. Good examples from this study include warehousing and purpose-built student accommodation as the existing system effectively exempts or diminishes the liability of these types of development from developer contribution policies.

ES.64 However, it is unknown what proportion of development in each local authority is represented by these types of development. The aggregate 'take' of the IL will be strongly influenced by the degree to which it encompasses development which would have historically been either partly or wholly exempted from developer contributions under the existing system. Similar observations could be made regarding small scale development, typically fewer than ten dwellings, that are currently routinely outside the scope of developer contributions policies but would come into scope under the IL as proposed.

ES.65 Secondly, the research presented in this report would suggest a case for some variation of IL rates within local authorities to mirror the variable nature of real estate markets. The modelled outcomes presented in this document would suggest that rates that might be appropriate for one type of development may crowd out others. For example, an IL rate that might be appropriate for model B4, the purpose-built student accommodation, may not be appropriate for models B2 or B3, a brownfield residential scheme and a build-to-rent scheme. The question of whether this trade-off is desirable or not is one that would be related to whether the goal is to maximise proceeds from the IL or shape the character of built environment outcomes.

Questions for policymakers

ES.66 Three significant areas for reflection for policy makers arise because of the research contained in this report.

ES.67 Firstly, it will be important to reflect carefully on the potential impacts of the IL on the development industry. For example, it is conceivable that the IL may prompt developers to reconsider both where and what they develop in response to the landscape of IL rates. There may also be variability in some of these behavioural shifts prompted by the introduction of the IL across the development industry: SME and volume developers may respond differently to the IL.

ES.68 Secondly, the scale of reform implied by the replacement of the existing system with the proposed IL is likely to take a relatively significant period of time to implement. A range of possible scenarios are easily imagined over such a transition period: some developers may rush to get applications in before the introduction of the new, unknown, system; other developers may choose to wait in the hope that the new system is itself subsequently replaced. Both scenarios have historical echoes with previous moments of reform, such as 1966. when the Land Commission and the Betterment Levy were introduced and in 1974 when the Community Land Act, including the Development Land Tax, were introduced.

ES.69 Thirdly, a locally raised and spent IL will result in the greatest value of developer contributions being concentrated in the highest value areas. This is equally true of the existing system. Further testing, trialling and real world evidence may be important to support decision makers to refine the proposed IL to support the government’s wider levelling-up agenda.

Chapter 1: Comparing the proposed Infrastructure Levy with the existing system

Key findings

- Our research was undertaken based on an initial specification document made available to us in September 2021. Decisions relating to the Infrastructure Levy since that date are not reflected in this report.
- The proposed levy would replace the existing system, whereby developers contribute to the costs of infrastructure and affordable housing, with a sales value levy paid upon the occupation of developments.
- The IL would apply to most new developments unlike current practice with S106 and CIL. However, a modified S106 in kind route-way would be available for large and complex sites. Planning conditions are expected to be used on other sites.
- Introducing the IL would be an obligation for all planning authorities but decisions on levy rates and associated matters (including thresholds below which no levy would be paid; and the identification of large and complex sites) would be decided by local planning authorities as part of their local plan process.
- The new system is intended to reduce the complexity, risk and uncertainty which many developers face under the current S106 and CIL arrangements. However, some complexities will remain, particularly at the local plan stage, as there will be many detailed decisions to be made about rates and other matters.
- Risk may increase for local authorities because they may need to borrow funds to finance site mitigations and other infrastructure before the levy income is received.
- The intention is to secure as much funding as under the current system. This depends on rates set but also more developments will be covered, potentially generating higher funding income. There will also be more flexibility as to how the income may be spent.
- As with S106 and CIL it is expected that levy liabilities will be taken into account through lower land values, especially as there will be greater certainty with respect to rates. To the extent that land values fall further than under the current policy and practice this will impact on the wider tax income of central government in terms of SDLT and CGT.

Introduction: mitigation, taxation, or a mix?

1.1 The proposed levy on total sales value of completed developments would replace a system principally designed to secure contributions from developers to pay towards the costs of mitigating the external costs of development on local services and of making new development acceptable in planning terms, including by providing new affordable homes. Thus, there would be a shift from a cost-based system of mitigation to one of value-based taxation. However, because the income is to be secured to pay for certain specific investments (including affordable homes and infrastructure), the new measure still has some attributes of mitigation and remains a hybrid system. To understand the proposed approach, it must also be seen in the context of the wider reform to the planning system designed to speed it up and facilitate more development, especially of housing.

A changing system: from contributions to costs to taxing sales incomes for local spending

1.2 Throughout the many attempts to reform the current system of developer financial and in-kind contributions there has been a tension about its conceptual underpinning. Is it about, on the one hand, securing contributions to costs - which will inherently have the effect of reducing land values (because developers offset the costs by paying less for land)? Or is it, on the other hand, explicitly a system aimed at capturing a proportion of the increase in land values arising from planning consents? The proposed levy moves the system more firmly into the latter category (see Annex 3 for a brief history of developer contributions).

1.3 The basic principle that lies behind the existing S106 developer contributions legislation is that the contributions should be based around the costs of mitigating any negative impacts of development and more generally of making the development acceptable in planning terms (including through the provision of affordable housing). It is thus a cost-based system.

1.4 CIL was introduced in 2010 as a means of providing a contribution to the infrastructure needs of the authority as a whole and indeed across local boundaries. CIL is charged on all new developments' net additional floorspace. The rates, which are set per square metre by the authority, are generally set to balance the need for investment requirements with viability in the relevant area. Mayoral CIL goes one step further by contributing to the costs of large-scale infrastructure.

1.5 The Infrastructure Levy (IL) on the other hand is based on outturn revenues so it is fundamentally value based. It does not directly link to either mitigation or investment requirements. It is fundamentally a sales tax that raises revenue on development of all types to be spent mainly on infrastructure as the authority determines. It can therefore be seen as a specific form of land value capture, taxing the outcomes of development and their value. Local authorities will be able to use the IL revenues to mitigate negative development impacts but also for other infrastructure purposes. In addition, planning conditions will play a larger role than under the existing system. Conditions on planning permissions can specify a range of requirements including pre- commencement ones but may not specify any financial matters. As now, planning authorities will be able to refuse planning permission where the external costs of development cannot be appropriately mitigated.

1.6 Two core distinctions (as understood at the time of writing) are that (i) the setting of an Infrastructure Levy will be a mandatory requirement placed upon all local planning authorities, whereas the decision on whether to adopt the current system of S106 obligations and/or CIL is a matter of discretion for local planning authorities; and (ii) the degree of prescription in how the money must be spent. Under the existing system the use of funds is specified in S106 planning agreements. There will consequently be choices for policy makers regarding how that will work under the IL.

1.7 Under both approaches, S106/CIL or IL, the contributions/levies are restricted to new build (or major conversion) and do nothing to tax value increases in existing usage. However, it is proposed that permitted development will be subject to the levy; while currently S106 cannot generally be charged except when prior approval is involved.

1.8 Our research was undertaken based upon an initial specification document prepared by DLUHC and made available to us in September 2021. Decisions relating to the Infrastructure Levy since that date are not reflected in this report. The general principles had been set out in the White Paper on planning reform (MHCLG, 2021). In addition, we were provided with technical documents by officials which clarified the position in September 2021. We based our analysis on these documents together with some later verbal clarifications. We have not been party to the continuing policy discussions.

The two systems: an initial comparison

1.9 As already clarified, the proposed Infrastructure Levy moves from a system which seeks developer contributions to the costs of the infrastructure needed for site mitigation, related community needs and the costs of providing new affordable homes to one that taxes sales income to provide funds for infrastructure and specifically affordable housing contributions as with S106 and CIL but also potentially a wider range of infrastructure. It is thus still a hybrid.

1.10 The existing system involves significant, and often complex, time consuming and uncertain, negotiations between local planning authorities and developers to ensure legally enforceable contributions that are both viable and policy compliant. The result is that developer contributions can vary quite significantly relative to both the geography of development values and the relative negotiating powers of the parties to a S106 agreement. However, the existing system does guarantee a connection between the site of development and the return of development value to that site for mitigation purposes. This is a valuable aspect of the system as it provides both developers and communities with the certainty that site-specific requirements will be provided alongside a development. Nevertheless, the inherent variability in the system has, over the last few years, led to several important recommendations and proposals regarding how the system could be simplified and standardised (including the adoption by many local authorities of standard tariffs) (for a review see Crook *et al*, 2016).

1.11 The proposed new Infrastructure Levy system remains complex especially with respect to the local plan stage, involving many decisions on its local structure and levy rates especially if these are the responsibility of the local authority within the framework of the local plan. However, in principle, its implementation is much simpler, with no negotiations and more predictable outcomes in terms of developers' tax liabilities. There will still be issues for discussion not least concerning the final Gross Development Value, staging and related matters.

1.12 The proposed new system as specified here modifies the current S106 contractual relationships between contributions agreed and the provision of infrastructure. For most sites the levy paid in cash will primarily replace the current arrangements. In addition, there will be greater use of planning conditions and a limited use of S106 obligations in cases where conditions are not appropriate. For these sites, there is a less obvious guarantee than in the current contractual S106 system that the infrastructure needed will be provided - and in a timely manner.

1.13 For large and complex sites there will be different arrangements through an infrastructure in kind route-way which will use a combination of S106 obligations and planning conditions to secure infrastructure and other requirements such as affordable housing.

The current system: amounts raised, delivered, and who pays for the contributions

1.14 Significant sums have been agreed for developer contributions and raised through CIL. In 2018-19, the latest year for which figures are available, around £7bn was agreed through S106 and CIL, of which £1.3bn was for infrastructure, £1bn for CIL and £4.7bn for new affordable homes (providing 44,500 new affordable homes) (Lord et al, 2019). Because policy has emphasized the on-site provision of new affordable homes, planning obligations have also contributed significantly to the mixed communities' agenda, since many households in deprived circumstances (often with young children) are enabled to move to social and affordable rented housing in new market housing developments often in areas with low levels of social deprivation (Crook et al, 2016).

1.15 Developers can offset the costs of their contributions by negotiating lower prices for land. This is particularly the case where local plan policies are clear about expectations of contributions and where major developers have sought consent and have taken out options agreements with landowners. In cases where local policy is not clear or is inconsistently implemented and where smaller builders with less capacity to negotiate are involved, at least some of the costs tend to fall on developers rather than on landowners and on the mix of affordable housing they provide.

1.16 Research also shows that developers and housing associations negotiate the price (which may be zero or the building costs or the discounted net rent they receive for the rented units) at which affordable housing is transferred. Also, developers often complete the agreed element of affordable housing at an early stage thus generating speedier positive cash flows compared with the usually slower rate of market sales.

1.17 Estimates indicate that S106 and CIL have captured approximately 30 percent of the increased land value on greenfield sites from landowners/developers, with another 20 percent captured by national capital gains and stamp duty land taxes (Crook, Henneberry & Whitehead, 2018). Most of what had been agreed was delivered and any shortfall was mainly due to schemes not proceeding or being changed - for example a large development scheme being broken up into smaller schemes and sold on to other developers (e.g., by land promoters) resulting in renegotiated planning applications and (usually lower) S106s.

1.18 The use of developer contributions to capture development value has also been far more successful than the previous unhypothecated national taxation measures (Crook *et al* 2016). A significant element of this success comes from the widespread acceptance of this locally based approach, reflected in the responses to the various government consultations on changes to the existing system and the evidence presented to the Housing Communities & Local Government Select Committee inquiry on land value capture (House of Commons, 2018).

The current system: a preliminary assessment

1.19 Developer contributions work best in high value areas where land values are sufficient to generate levels of funding with which all sides are comfortable. They do not work as well in lower value areas as there is less leeway for additional expenditures. Accordingly, far more is secured in London and the southern regions of England than elsewhere.

1.20 Irrespective of location they work best when the market is buoyant, generating continuing increases in the land values that can make negotiation easier; Conversely, they work less well in market downturns. In cases of large development sites, local authorities often include phasing clauses in S106 agreements that enable contributions to be related to market swings. Market downturns often lead to developers seeking to renegotiate agreements. However, courts have recently held that developers must conform to policy compliant agreements even if they have paid too much for the land.

1.21 Since there is heterogeneity in the housebuilding industry (in terms of size, ownership, regional and target market orientation), not all developers are affected in the same way by market values and their variation. Some, for example, may have target returns and business plans that enable them to cope with downturns. Hence what is viable under one S106 agreement may not be viable for another developer.

1.22 Despite the existence of more fixed and standard tariffs for contributions, the process involves a great deal of negotiation which can be time consuming with uncertain outcomes. Developers also often have greater skills and more resources than many local authorities. Equally there are benefits from long term relationships that all parties are comfortable with, so the maximum may not be requested. Whilst negotiations enable agreements to be struck in the light of the specific circumstances of each site, they inevitably create some uncertainty for developers and add to their costs. Larger developers (e.g., volume housebuilders) may well be able to absorb these extra costs (and pass them back eventually to landowners in prices paid because options agreements for the purchase of land normally allow the price to take account of S106 obligations and CIL). This is more difficult for SME developers who lack the resources as well as skills to take part in lengthy negotiations.

1.23 What can be secured is also affected by the range of exclusions and exemptions from S106 and CIL especially for smaller sites and for permitted development (in the case of S106) and development by charities, self-build and custom-built homes etc. These exclusions and exemptions significantly reduce what can be secured. Self and custom-built homes are expected to continue to be exempt from IL.

1.24 Exemptions are particularly relevant as numbers of local authorities have seen it as a reason why they could not gain enough from CIL to make CIL worthwhile (especially as a proportion of CIL must be passed through to local community groups for very local infrastructure). S106 obligations have generally also not been effective at raising revenue from commercial development (except large retail).

The infrastructure needs of large sites are currently problematic to deal with through CIL because of the complexity of these sites and the long-time scale involved in completion. Instead S106 is normally used. Under the IL it is expected that on large and complex sites, S106 planning obligations may still be used, but that anything secured through this 'infrastructure in-kind route-way' must equal or exceed the value of what otherwise would have been secured through a calculation of the IL.

1.25 Given the discretionary nature of the current system, there are significant variations between local authorities in policy and practice. As a result, there can be major differences between neighbouring authorities in what is secured, even though they have similar market conditions. Whilst this is an inevitable outcome of a discretionary policy, consistent approaches between planning authorities can help secure significantly more funding. Moreover, CIL is not charged by many authorities because of concerns regarding viability as well as exemptions. CIL has been subject to several changes; it has not always been spent on infrastructure critical to development; and it does not work well for large and complex sites.

1.26 With respect to affordable housing secured through S106 there are several recurring issues. It is sometimes seen to be of low standard and tends to provide intermediate rather than the social rented housing that many local authorities would wish to be provided through S106 (Crook *et al*, 2016). Where local authorities have increased their requirements for proportions of affordable homes on market sites, developers tend to offer to deliver shared ownership products to maintain viability or their overall rate of return.

1.27 Moreover, there is a potential interaction between decisions on charging CIL and the amounts of affordable housing that can be delivered through S106 since charging CIL may leave less land value available for affordable housing. Recent research shows that CIL can 'crowd out' affordable housing secured in weak markets but does not do so in stronger markets (Lord *et al*, 2021).

1.28 Importantly what can be secured in terms of affordable housing is affected by the default zero grant policy of Homes England (and its predecessors) which is applied when registered social providers buy completed (or themselves build) dwellings for affordable homes from developers on S106 sites. This contrasts with the situation in Scotland where substantial grants are available to affordable housing providers, whether acquiring new affordable homes through S75 (the Scottish equivalent of S106) or not, with the result that a large proportion of new affordable homes delivered through planning obligations are social rented homes (Blanc *et al*, 2021, Boyle *et al* 2022).

The proposed new system of Infrastructure Levies: principles

1.29 The IL aims to overcome many S106 and CIL limitations.[1] It will be mandatory for all local planning authorities to charge a levy and they will have the power to decide on the rates (including different rates for different types of locations, i.e., zones) and proposed rates will be subject to testing at local plan inquiries. There will also be an option to retain S106 for large strategic sites and other complex sites through an infrastructure in kind route-way. Planning conditions may also play a larger part than under the existing system as many of the policies will be set out in their adopted local plan. The IL will be a charge on all development including permitted development (except for custom and self-build developments) - so is far more broadly based - and will be levied on the final value of developments (i.e., gross development value). Conceptually, it is a simple sales tax unrelated to the principles of obligations. Mayoral/Strategic CIL in London and the Combined Authorities will become an element within the IL. Levy rates and justification as to their viability will be determined within the local plan process, including as part of public inquiries into plans, and any large sites that would still be subject to S106 type negotiations would be identified in the local plan.

1.30 There is to be a threshold, based on average build costs per m² (including professional fees, site preparation and developer profit) and an allowance for land value, up to which the rate will be zero. Local Planning Authorities (LPAs) will determine the thresholds (for different types of sites), and these will also be subject to testing in public inquiries into local plans. Developments with values below the threshold will be exempt. All developments will benefit from a zero tax up to that threshold. Provided the tax remains certain, it should give a much clearer pass-through to land values – so it will be landowners who ultimately bear the levy. While the rate will be specified at the time of permission, the amount charged will be based on actual values at the point of occupation. This is almost the opposite of the position under S106/CIL (though some obligations are automatically reviewed if prices rise).

1.31 As many of the risks developers face will be less under the IL approach, their cost of capital should be lower and provide a more level playing field between large and smaller builders. The LPA may borrow (including from the Public Works Loan Board) against the expected levy income, but this could be relatively expensive because of uncertainties about the value and timing of such income. Staging payments as parts of the development are occupied would reduce these risks. Local authorities will be able to use the income from the levy in a more flexible way than is generally possible with S106, for

[1] As noted above, our understanding of how IL might be implemented is based mainly on the technical information available in September 2021 and the White Paper together with later briefings on how the details were being developed by officials.

example as a fund to enable mitigations to be addressed across several sites, not just the ones from which the levy income is derived.

1.32 Clearly both the levy rates and the thresholds above which the rates will be charged will be critical to determining the levy income that local authorities will receive and the viability of the sites. Hence there are also issues around the incentives that the new system would generate. Many of the attributes of the IL approach should increase efficiency and expand investment. However, local rate setting and their associated thresholds would also raise issues around inter-authority competition on the one hand (e.g. setting rates to attract development) and the political pressures in some areas to deter development by keeping rates high in others. Finding the appropriate level to achieve desired development will be a complex process.

1.33 Many aspects of the proposal are still to be decided and it is possible to foresee circumstances where rates and/or thresholds will need to be adjusted on a zone-by-zone basis if, in the process of considering individual planning applications, local authorities find development is unviable. Additionally, there will be scope for much consultation on rates, thresholds, and the nature of large/complex sites in the preparation of local plans and the testing of plans at public inquiries. This means that complexity and negotiations will become part of levy practice, especially at the rate setting stage, and generate a certain amount of uncertainty about outcomes.

1.34 The White Paper noted that local authorities would have discretion as to how receipts were spent but the assumption must be that priority will be given to infrastructure related to new developments and for new affordable homes - as spelled out in the authority's Local Plan - although it could be used in other ways. The current local neighbourhood share based on CIL payments will be retained. Subject to the requirements stated in revised/simplified Local Plans, developers will be expected to provide on-site affordable homes up to a specified proportion of the total value of the levy, including the new 25 percent First Homes element of the affordable homes total. The net cost of the new affordable homes (defined as their market prices less the price paid for them by affordable providers) will be part of the levy liability but subtracted from the IL payment to the local authority upon occupation of the whole development. As an alternative, local authorities may take the whole of the IL proceeds and use some of these to fund new affordable homes directly themselves, e.g., by providing a grant to affordable housing providers. Equally, they may use it for other purposes.

1.35 Apart from the S106 in-kind route-way for large and complex sites, there will, unlike the current S106 arrangements, be no contractual arrangements between developers and local authorities for funding to be spent on the infrastructure needed specifically for the development. However, it is possible that through a wider use of planning conditions and narrowly targeted S106 planning obligations where conditions cannot be used, developers will be able to provide it themselves on-site to enable development to proceed and the (presumably certified) costs of works would then also be netted off from the IL payment, whilst other infrastructure (for example education) will be secured through levy payments.

How the proposed system addresses the problems with S106 and CIL

1.36 The IL, in principle, has an attractive simplicity and addresses many of the problems with S106 and CIL highlighted above. However, the details that will need to be decided suggest that the IL poses a different set of challenges. These include fixing thresholds, agreeing GDV valuations, determining the IL percentage and dealing with the TIF (tax increment financing) style borrowing costs for local authorities that will reduce what the IL can fund.

1.37 If market conditions change and the GDV differs from that projected at planning consent, there will be adjustment issues. If the GDV is lower, the White Paper on planning reform suggested that this might be dealt with by ‘flipping’ any on-site affordable homes into the market sector. However, this may be impossible as affordable homes are generally built early and sold to housing associations (although First Homes will be sold direct to new home buyers), to help developers’ cash flow. If this is the case the homes will be occupied well before the development is complete. If the GDV is higher, this will result in more income for the local authority. In addition, the IL will shift the balance between certainty and risk both for local authorities and for developers.

1.38 For local authorities there will no longer be the need for exhaustive analyses of the needs and costs for site mitigations and infrastructure to justify either S106 policies on a site-by-site basis or the wider CIL charge regimes (nor to hold public inquiries into the same). However, IL levies and thresholds will be subject to public inquiries into local plans where these rates etc will be set out, thus facilitating discussion of the evidence behind these key decisions. And if local authorities want IL to fund on-site affordable housing, they will still need to have clear policies in their Local Plans and associated policy documents.

1.39 On the other hand, IL income will depend on a range of factors, including levy rates and thresholds (and how they are set), valuations of GDV, and the changes in market prices that will occur between those estimated at planning consent and those achieved upon completion. This will make the IL income to local authorities more uncertain.

1.40 For developers, big and small, uncertainties will be reduced. The complexities of negotiations will largely be eliminated save for sharing their GDV estimates when applying for planning consent and subsequent valuations of GDV, of ‘losses’ made when selling affordable homes, and maybe of the provision of other infrastructure required by planning conditions as part of on-site provision upon completion. They will know their liabilities at least in principle well in advance, which will help with their cash flow. They will not need to pay the IL charge until the development (or specified stages) are finally occupied (an element that could incentivise behaviour to reduce payments).

1.41 Based on the initial specification document shared with the research team in September 2021, one important area where the proposed IL may result in uncertainty is in relation to the timeliness of infrastructure delivery – an issue that has also been identified with CIL. For large and complex sites, the issue of synchronising development with attendant requisite infrastructure will be managed through the proposed S106 route-way. For all other developments planning conditions may be required, as in Scotland (Blanc, *et al*, 2021; Boyle *et al,* 2022), to secure vital infrastructure with levy payments being used for wider non-site-specific infrastructure. Depending upon how such planning conditions are used, it may be necessary for payments made by developers to comply with planning conditions to be valued and accounted for when agreeing final levy payments.

1.42 It is worth noting that this type of approach has not, as far as the Authors' are aware, been replicated in other comparable countries. In the context of new development, it is perhaps more normal (e.g., in the Netherlands and Germany) for local authorities to take a more direct role, for example by purchasing the land before planning permission and selling it at the higher value when development has been agreed (Crook, 2019). In the context of the provision of affordable housing local inclusionary zoning powers are quite generally used (Crook *et al*, 2016). Few countries find it politically easy to maintain land value or property taxes where values are regularly updated as land values change (Lunde & Whitehead, 2021).

The new value-based approach and equity efficiency and public finance criteria

1.43 How far does the proposed levy fit with key efficiency, equity, and public finance criteria? (Crook & Whitehead, 2019). Is it fundamentally just a change in financing mechanism; a way of ensuring more money is raised and/or more infrastructure is provided; or does it also provide better incentives to participants?

1.44 The IL clearly has potential efficiency benefits through distorting fewer development decisions, potentially speeding up development and lowering costs of determining the tax. Nonetheless, as happened with previous national taxes some of the inherent uncertainties (e.g., how the threshold value should really be determined; who bears the costs if the infrastructure is not provided or is delivered late by the LPA) may well result in delays and risk deterring development. Unless the yield of the levy, net of the costs of affordable homes, is ring fenced for specific expenditures, there are also limited incentives for the LPA to spend the money on the critical infrastructure required in a timely way.

1.45 The situation with respect to equity is far less clear. There is no requirement to offset the costs of the development to local residents and affordable housing may be sacrificed to return a development to viability if the market value of completed development is less than projected at the time of planning consent (as happens now with S106 renegotiations). Addressing these risks may have implications for the size, standards, and costs of some or all the planned affordable homes. Equally some of the levy will go to Parish Councils, reducing the total available for other requirements.

1.46 The local authority (and therefore local people) bear market risks - which under S106/CIL are borne (and managed) by developers. It will therefore be important in the detailed design and implementation of the IL to ensure that local communities do secure benefits, including affordable homes and local infrastructure – as opposed for instance to the levy being seen as general revenue which does not directly need to benefit those living in the neighborhood of new development.

1.47 Whether there will be horizontal equity, notably in spatial terms, depends particularly on whether there are multiple rates; whether there are significant exemptions; how cross-borough expenditures are determined; and most importantly, on whether and how areas with inadequate levy revenues will be supported. It is consistent with vertical equity in that developers/landowners in areas with greater demand and values pay more – and there may be the potential for more money to be raised in lower valued local authorities. There will also be an impact on land values such that if they are reduced more than under the current S106 and CIL arrangements central government tax revenues such as SDLT and CGT may be affected. It may also be seen as reinforcing the differentials in opportunity to capture land value between authorities and regions.

1.48 In terms of taxation, the principle that unearned increments in land value should be taxed is followed and much more directly than is the case with S106 and CIL. Greater certainty should lead to the tax being more effectively transferred to the landowner as well as increasing investment levels and therefore overall tax-take. Given its structure it is reasonable to regard the IL as fundamentally a land value capture mechanism based on the uplift arising from the granting of planning permission. What is less clear is how the incentives of local authorities, developers, and landowners particularly with respect to expenditures would change compared with current policy and practice.

1.49 Whether the IL is an effective policy will be contingent on the wider planning and taxation regimes within which it will operate. It would therefore be desirable to undertake an evaluation which can relate the IL approach to the broader land value capture and planning mechanisms within which it will operate – once these have been determined.

1.50 Most importantly, will the IL be effective at raising revenue? The government intends that at least the same will be collected as under S106 and CIL. However, this depends on how the rate or rates and the threshold will be set – which, it appears will be fundamentally political decisions for local authorities to determine and justify in their Local Plans. The overall total could be much larger – especially given that smaller residential developments, permitted development and commercial developments are included and if greater certainty increases investment - but equally it could be whittled away as the details are determined. There is also a risk to local government income if success at raising the levy and using it for general spending and not only on affordable homes and infrastructure leads to reductions in central government revenue support.

1.51 Some preliminary modelling (Crook, Henneberry & Whitehead, 2021) suggested that only with regional rather than national rates and high percentages of affordable homes funded by the levy in the southern regions would the same income for infrastructure and numbers of affordable homes be secured as under S106 and CIL in 2018-19. Local rate setting was not modelled, and this approach will clearly change that picture. However, it will not solve the more fundamental problem that in many parts of the country significant numbers of developments could come in below the threshold or generate little additional land value to be captured, an issue also for the current system. So, making the system locally based could result in more revenues overall, while leaving many authorities with large gaps in their funding.

1.52 Finally, this chapter is comparing a proposal in principle with an established system with all its practical difficulties as well as the benefits of its flexibilities. In principle there are clear potential benefits of simplicity and transparency but also areas of concern as discussed above. How these benefits are to be realised will only become clearer once the details of the legislative framework, the role to be played by local plans and the ways in which local authorities will be enabled to operate are known - as well as how the land market and developers respond to the detailed proposals. As with all such changes, the transition period will be complicated.

Chapter 2: Study design and methods

Key findings

- This research reports both quantitative modelled findings for 24 hypothetical developments in six real world case studies (four developments per local authority) and qualitative findings on the potential practical implications of replacing the existing system with the IL.
- Chapter 2 details the process by which case study local authorities were selected and the measures taken to ensure a diverse range of development context were considered.
- The chapter also provides full details of the principles and key assumptions that were a necessary condition for the modelling work discussed in the following chapter and Appendix 1.

Introduction

2.1 One of the primary objectives of this research is to provide evidence on how English local planning authorities might produce an Infrastructure Levy charging schedule. As outlined in Chapter 1 the implementation of CIL and S106 have historically been variable between local authorities and their operation has been influenced by local housing market conditions. Therefore, to achieve this objective, it is correspondingly necessary to ensure that the research covers a variety of development contexts.

To what value would the IL be applied?

2.2 The basis for the modelling conducted in this document comes from a Technical Specification Document prepared by DLUHC for the research team in September 2021 that sets out the principles by which the IL might operate.

2.3 The IL is conceived as applying to the difference between a minimum threshold and the sales revenue achieved on new development. Both the minimum threshold and the specific IL rate to which a development would be subject would be locally determined.

2.4 The minimum threshold would comprise the main non-land construction-related development costs (base build costs, site preparation costs, costs of external works, professional fees and contingency allowance). The Existing Use Value would also be included in the calculation of the minimum threshold. In the modelling, these values are expressed in terms of £/m² of sellable space developed.

2.5 In our modelling we present an estimated lower and upper bound value that the IL might conceivably take. The lower bound is equal to the policy-compliant implementation of the existing system; the estimated upper bound is the maximum value the IL could take without eroding an ‘acceptable’ return to the landowner, defined for modelling purposes as benchmark land value, and the developer, defined for modelling purposes as 15% internal rate of return (IRR).

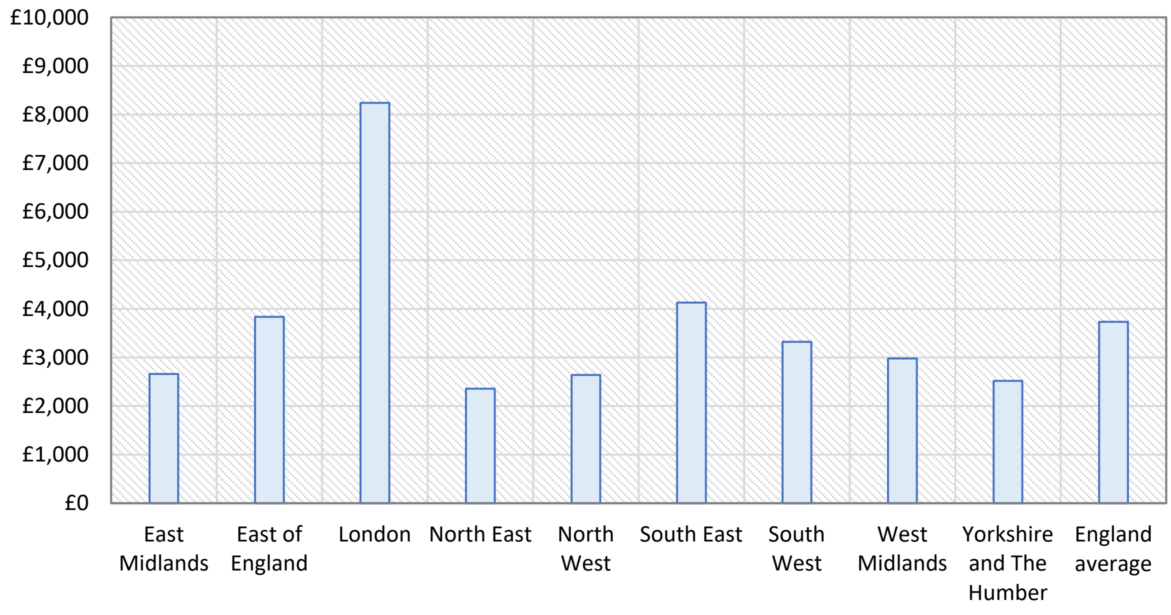
2.6 Both the modelled return to the landowner and the return to developers are discussed in greater detail in this chapter. However, it should be clearly noted that our modelling makes two significant assumptions:

1. An acceptable return to the landowner is defined as the difference between the EUV and the Benchmark Land Value, and
2. An acceptable return to the developer is defined as a 15% IRR.

The value of residential development in the English context

2.7 To model the effects of the proposed Infrastructure Levy it is essential to understand the highly variable nature of the English development context. This phenomenon is best illustrated by the value of newly built residential development, which represents most development upon which developer contributions have historically been exacted and would, by extension, be the largest contributor through the proposed Infrastructure Levy. Figure 2.1 illustrates the price (£/m²) paid for newly built residential dwellings in 2020.

Figure 2.1: New build price per m² (£) by English region, 2020



Source: Authors’ calculations from HMLR ‘price paid’ data

2.8 The new build dwelling prices detailed in Figure 2.1 were determined following the analysis of the 553,304 'price paid' records from HM Land Registry from 2020[2]. To arrive at a £/m² price the corresponding Energy Performance Certificate record for each sold new dwelling was matched to the price paid data, of which there were 36,129.

2.9 In order to provide a complete geographic picture of new build values it was necessary to give an estimate for those Lower Super Output Areas (LSOAs) that did not experience any new housing development activity in 2020. As newly built dwellings typically command a premium to property prices in the secondary market a method was applied that quantifies this premium at the local authority scale and then applies it to any LSOAs that had not accommodated any newly built dwellings in 2020.

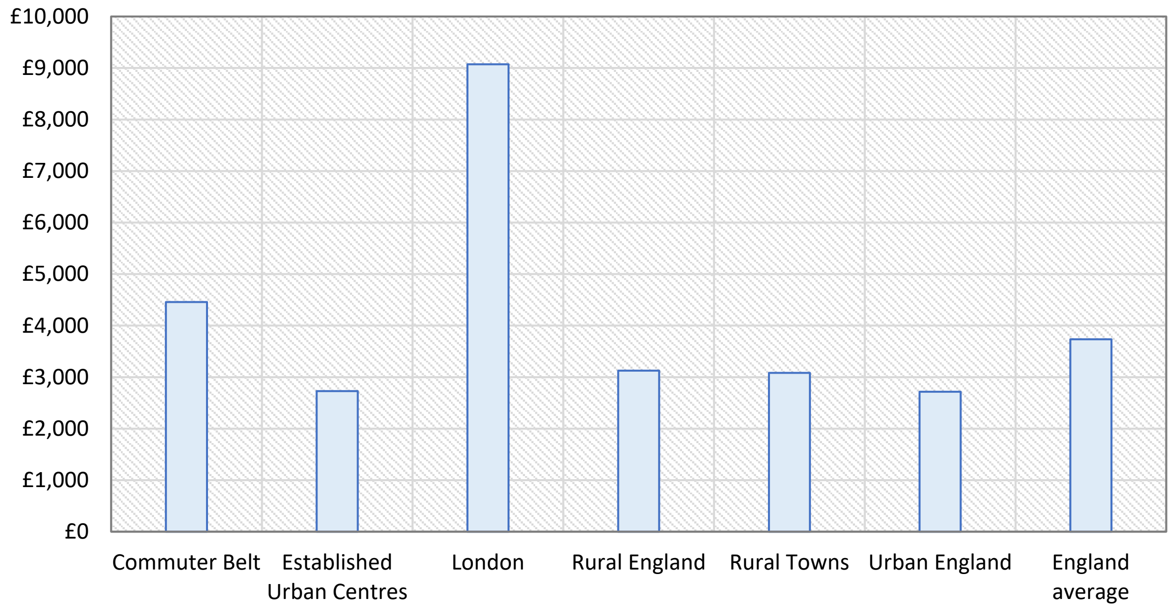
2.10 According to our analysis, the average price of new build residential property in England was £3,734/m² in 2020. This figure had decreased by 2.5% compared to the 2019 figure of £3,830 per m². However, as Figure 2.2 illustrates, new build property prices show significant variation when viewed at the broad geographic scale of the English regions. New build values in London were an average of £8,240 per m² in 2020, whilst in the North East the average was just under £2,358 per m².

2.11 Whilst there is significant variation in prices between regions, there is also significant within region heterogeneity. An alternative way of thinking about variations at a broad scale would be to consider a local authority 'family' typology, which organises local authorities that are similar, with regards to their housing and planning characteristics (see Appendix 5 for the classification), irrespective of their regional location. Thus, this approach is helpful in considering property price variation according to groups of similar local authorities regarding development activity.

2.12 Using this typology, the price per m² for new build property by local authority families is set out in Figure 2.2. Although the values are different to those set out in Figure 2.1 the variations are similar. London is clearly an outlier in both classifications. The London family has an average new build price per m² of almost £9,072 whilst the average for authorities in the Established Urban Centres family is £2,728 per m². This suggests that the current S106 and CIL system has been operating in local authorities with very different property prices, as well as those in distinct geographical and housing development contexts. Should this variation continue, the IL will have to be capable of operating across similarly broad contexts.

[2] A total of 553,462 transactions records were collected for 2020 by matching price paid data and EPC data. 158 abnormal records – where the size of the property was less than 10 m² or the price less than £1000 - were excluded from the analysis.

Figure 2.2: New build price per m² (£) by local authority family type, 2020



Source: Authors' calculations from HMLR 'price paid' data

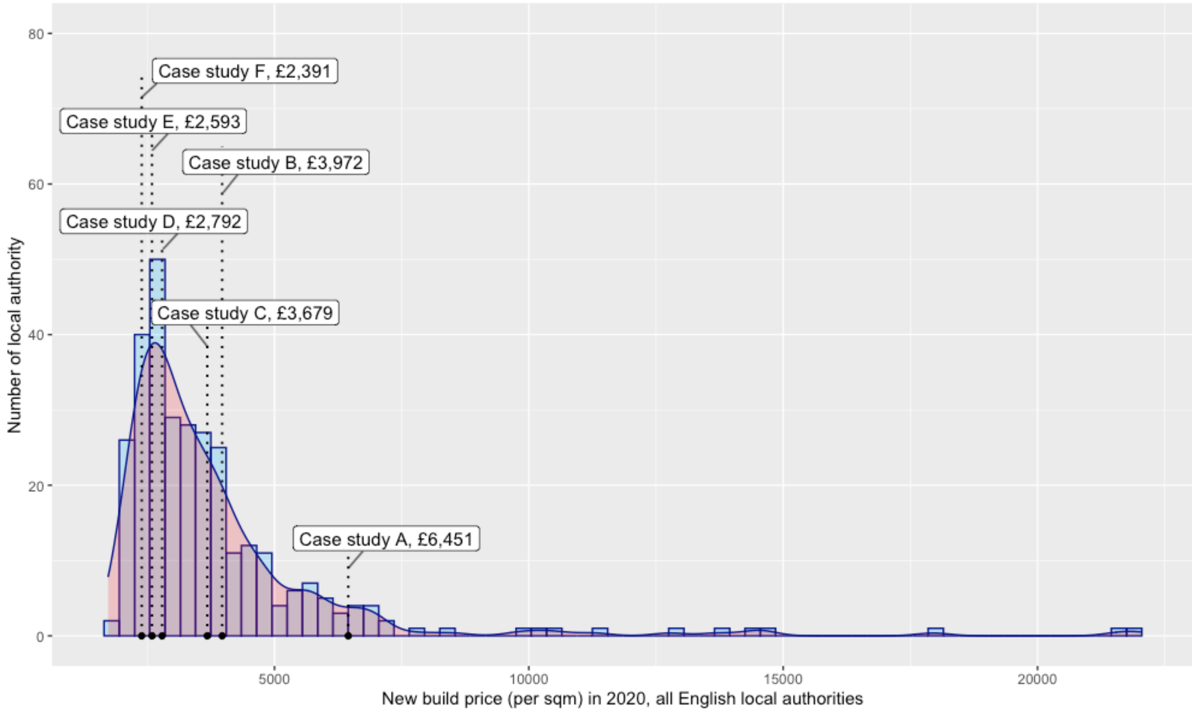
Case study selection

2.13 To understand how English local planning authorities might produce an IL charging schedule, a series of in-depth case studies were undertaken. These case studies enabled detailed modelling of a potential IL as well as discussion with local authority housing, planning and development officers to explore the current operation of S106 and CIL (where relevant) and their perceptions of potential key considerations in the creation of an IL charging schedule.

2.14 Because of the contextual variability illustrated above it was essential to ensure that the case studies were representative of the full range of development settings across England.

2.15 The following histogram (Figure 2.3) shows a distribution of the average new build property prices in 2020 across all English local authorities. The local authority with the lowest average new build dwelling price is Calderdale at £1,732/m² whilst the local authority with the highest average new build price is Westminster at £22,025/m². Following an analysis of the distribution of property prices combined with the requirement to provide a geographic spread of local authorities, six case studies were chosen as detailed in Figure 2.3 and Table 2.1 below.

Figure 2.3: A histogram showing new build house price distribution for all local authorities in England, 2020, with case study new build prices identified



Source: Authors' calculations from HMLR 'price paid' data

2.16 In addition to fulfilling criteria of market and geographic heterogeneity the six selected local authorities also individually represent each of the six local authority 'family' types as described in Table 2.1 below.

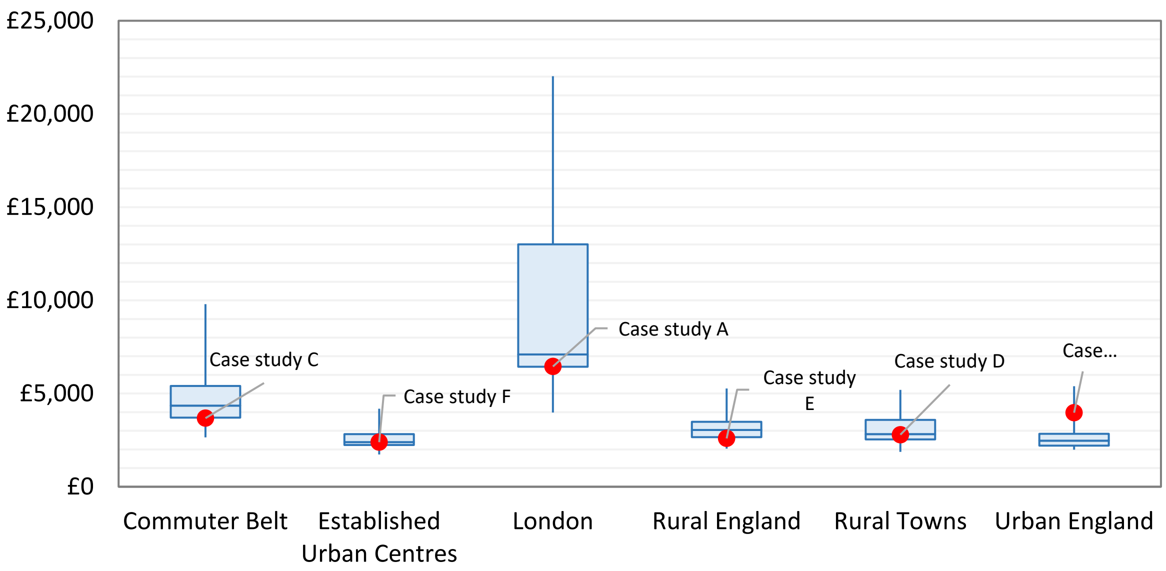
Table 2.1: The local authority family typology and the six selected local authorities

Local authority family group	Case study local authority
London	A
Urban England	B
Commuter belt	C
Rural towns	D
Rural England	E
Established urban centres	F

Source: Authors'

2.17 Ensuring uniform coverage from across the local authority family typology was important to ensure consistency with previous studies of the value and incidence of developer contributions commissioned by the then MHCLG (Lord et al., 2018, 2020). Figure 2.4 puts the six local authority case studies into the context of the family group to which they belong regarding the new build price per m² (£). As can be seen from Figure 2.4 each of the case study authorities is largely representative of the authorities in the same family group on this measure with only Case Study B recording a £ per m² somewhat greater than other authorities in the Urban England family.

Figure 2.4: New build price per m² (£) for each case study and the average for the local authority family group to which they belong



Source: Authors' calculations from HMLR 'price paid' data

2.18 Each local authority contains heterogeneity in new build house prices when considered for smaller level geographies. Using LSOAs (from the method described above) it is possible to observe the amount of variation within the case study local authorities. Case Study C (Commuter Belt) has a ratio of 2.15 from highest to lowest priced LSOA, whereas Case Study D (Rural Towns) exhibits much greater variation in prices with a ratio of 4.68 (see Table 2.2). This variation has implications for both development viability and the within authority geography for potential IL receipts, as such needs to be present in modelling.

Table 2.2: Lowest and highest new build prices for the six case study local authorities

	The LSOA with the lowest average price (per sqm)	The LSOA with the highest average price (per sqm)	Ratio of the highest to the lowest	New build price premium (average new/average existing)
Case Study A	£3,710	£13,636	3.68	1.5%
Case Study B	£2,355	£6,867	2.92	7.3%
Case Study C	£2,384	£5,115	2.15	4.7%
Case Study D	£1,033	£4,837	4.68	2.8%
Case Study E	£884	£3,670	4.15	22.4%
Case Study F	£1,067	£3,586	3.36	34.6%

Source: Authors' calculations from HMLR 'price paid' data

Model parameters and assumptions: bespoke models for bespoke case study requirements

2.19 The fundamental goal of the modelling reported in this document is to compare outcomes under three scenarios: no land value capture, the existing policy-compliant operation of CIL and S106 and a proposed IL regime. These three scenarios were compared across four different development typologies in the six participating local authorities, giving 24 bespoke models across five different development types:

i. Greenfield, low density residential schemes.

ii. Brownfield, high density residential schemes incorporating build-for-sale, build-for-rent and office-to-residential conversions.

iii. Purpose-built student accommodation.

iv. Distribution/logistics.

v. A strategic urban extension.

2.20 The decision about which development type to model was a joint decision between the research team, DLUHC and the individual local authority. This was to ensure a balance between local development relevance for the local authority, the ability to compare some key development types between local authorities and to capture variation against the most significant development types for developer contributions (see e.g., Lord et al., 2020). Greenfield, low-density schemes were by far the most prevalent accounting for 17 of the 24 development typologies. No local authority requested office or retail developments.

2.21 In order to make meaningful comparisons between a proposed IL and the existing system of S106/CIL across this range of development types, the research team had to make a series of modelling decisions in response to the fundamental questions that govern the IL's operation and effects. It is critical that these decisions are made clear and properly understood to ensure that model outcomes are not misinterpreted. The remainder of this chapter is a description of the methodological approach taken in response to the core questions and challenges that required a determination before modelling work could commence. The chapter concludes with a worked example.

What levy rate should be modelled?

2.22 The modelling work presented in this research provides estimated lower and upper bounds for the range of values at which the IL might be set in each case study development type. The lower bound describes the IL rate that would be necessary to achieve the same level of developer contributions that would be achieved under the policy-compliant terms applicable in the relevant local authority (discussed further in this chapter at 2.25).   The upper bound represents a notional ceiling: the maximum possible rate that IL could take whilst preserving development viability and the relevant benchmark land value. In the modelling exercise, this maximum is calculated in the following, iterative manner. The IL rate is changed until the estimated land value is equal to the estimated Benchmark Land Value. The Goalseek function in Excel was used to perform this task. The same procedure was used to find the IL rate that would deliver the same land value capture as the existing S106/CIL regime. Again, the IL rate was effectively changed until the estimated land value in the IL regime was equivalent to the estimated land value in the S106/CIL regime.

2.23 These lower and upper bounds that represent the range of values that the IL might theoretically take are set out in the full account of the modelling work (Appendix 1). However, to make direct comparisons between the IL and the existing system in a consistent manner across the full set of modelled development typologies, it was essential to make a decision regarding a specific rate at which the IL would be modelled. Consequently, we have chosen to arbitrarily model a hypothetical IL rate of 50%: that is, the local authority would receive 50% of the difference between the Minimum Threshold (plus, where applicable, the value of the affordable housing discounts) and the expected revenue received from sales. As noted above this decision was arbitrary and should not be taken to imply any policy preference or prescription either on behalf of DLUHC or the research team: the IL rate modelled simply allows for comparisons to be made across the 24 development types under consideration and for the extrapolation of the lower and upper bounds that the IL might take under these assumptions, discussed above.

What version of the existing system is being modelled?

2.24 Previous research (Lord et al., 2018, 2020) has illustrated that outcomes resulting under the S106/CIL system are highly variable between local authorities and imply variation over time. The scale of developer contributions achieved under the existing system can be strongly influenced by a wide variety of factors including local market conditions, the relative negotiating capacity/skill of local authorities and temporal variations in the macroeconomic climate. It is, therefore, not possible or desirable to compare historic real-world outcomes achieved under the existing system with hypothetical IL outcomes across a geographically variable set of case studies.

2.25 For the reasons outlined above we have chosen to model the scale of developer contributions that would be achieved under the existing system on each of the hypothetical case study development sites at the level required by local policy. This is most significant in relation to the scale of affordable housing modelled: our depiction of the existing system assumes that the locally policy-compliant requirements for affordable housing would be achieved. There is evidence that in many local authorities' policy-compliant developer contributions are not always achieved, and the value may be below policy-compliance and in some instances a null value. Thus, it is imperative to note that the modelling contrasts hypothetical examples of policy-compliant S106 and CIL with policy-compliant IL operation and should not be read to represent a contrast with real-world contemporary operation of S106 and CIL.

How are affordable housing contributions held constant between the existing system and the IL?

2.26 One of the central interests of DLUHC in commissioning this research was the effect of the IL on the scale of affordable housing that might be delivered; in fact, it has been said that the IL should only be introduced if it can deliver an equivalent or greater scale of affordable housing to the existing system.

2.27 For all IL scenarios, it has been assumed that the IL levy rate will apply to the difference between the total revenue and the minimum threshold. To model affordable housing contributions, it is assumed that the level of affordable housing delivered under the policy-compliant existing system and the proposed IL would be identical. To achieve this the value of the relevant affordable housing discounts is added to the minimum threshold. This means that for modelling purposes the levy is effectively charged only on the amount above the minimum threshold plus the sum of the affordable housing discounts and below the total revenue. This enables the 'in kind' contributions of affordable housing to be held constant between the modelled outcomes under both the existing and proposed IL regimes. It should be noted that this is purely a feature of the modelling process to meet the criterion specified for the implementation of the IL: that it should deliver an equivalent scale of affordable housing to the existing system. It is not envisaged by the research team that this would be the process by which the IL would be set by local authorities.

How are land values and land value capture estimated?

2.28 The approach used to estimate land value and land value capture is based upon well-established methods used by market participants. This involves cash flow modelling of the revenues and costs of development projects. Whilst much of this description of development appraisal techniques will be well-known to real estate specialists, it is key to understanding how developer contributions are theoretically transmitted to land values and to calculating how much land value is being captured through developer contributions.

2.29 The standard calculative technique used by developers to estimate land bids is founded on the premise that the landowners will receive the difference between the expected revenues from developing the land and the expected costs of developing the land with a normal profit to the developer deducted as one of the costs. The estimated surplus available for land purchase is commonly labelled a 'residual value' which is synonymous with the land value. All else equal, the lower the expected revenues and the higher the non-land development costs, the lower will be the land value. Developer contributions can reduce revenues where affordable housing 'replaces' market housing and can increase costs. For instance, CIL is a cost of development that can reduce the residual surplus available for a land bid.

2.30 Whilst there can be variants, the core model of development land bid determination applied by market participants is founded upon the estimation and processing of four main inputs:

- Total expected revenues from a development project.
- Total expected non-land costs (base builds costs, professional fees, demolition, marketing etc.) of a development project.
- Developers' minimum required return from a development.
- Expected timing of revenues and costs.

2.31 Expressed informally, land value bids are simply the output of a calculation of the development project's revenues and then deducting the expected non-land costs and a return to the developer. Timing is also a determining factor. The earlier costs and revenues are expected to be received, the higher the land value should be - all other things being equal. Development risk will be a determinant of developers' minimum required return. For instance, there will be much less uncertainty in appraising development sites where a planning consent has been granted. Where no consent is in place, depending on the planning status of the site (allocated, 'Call for Sites' etc.), developers will have less certainty about the likely timing of a consent, the size and composition of the scheme that will be permitted and the level of developer contributions that will be required. The additional uncertainty associated with such 'planning risk' will tend to increase the risk premium that developers require and reduce land bids.

2.32 Developer contributions can affect both the expected costs of and revenues from a development project in a range of ways. The resultant land value estimate will, in turn, be affected in sometimes obvious, measurable, and significant ways. However, land values can also be affected in more minor, more difficult to quantify, and less direct ways. Since it is by far the largest source of developer contributions in the UK, the provision of affordable housing provides a good example to illustrate the range of potential mechanisms by which the developer contribution is transmitted to development projects' costs and revenues. Whilst there are a range of minor ways that the proportion of affordable housing can affect the costs and revenues from a development site (speedier consent, higher density, lower build costs, reduced values of private housing, more certain revenues, earlier revenues etc.), apart from timing and level of direct revenues, second order effects are not incorporated in the modelling here.

2.33 The output from a development appraisal (usually an estimate of land value or the developer's return) can be very sensitive to changes in appraisal inputs, most of which are prone to a substantial degree of uncertainty. Sale values and base build costs are particularly important since many of the other inputs are expressed as ratios of them. Some of the ratios are factual – Stamp Duty Land Tax, for example – whilst others are also estimates (e.g., percentage of base build costs that professional fees represent). In terms of modelling land value estimates, commonly used assumptions regarding these ratios have been made, drawing upon CIL development viability studies that are in the public domain. Similarly, as well as relying upon the researchers' (sometimes tacit) knowledge other assumptions regarding affordable housing and additional S106 costs have been obtained from accessing the numerous CIL studies. Base build costs have been obtained from the Building Cost Information Service Construction Data (BCIS) which has become a standard source for viability analysis. For the specific local authorities, the modelling was informed by our contacts in the local authority.

2.34 A return to the developer has been assumed as an internal rate of return of 15% per annum. This is an important assumption and a full explanation for this important decision is set out in Appendix 2. The decision to produce models based on IRR, as opposed to a given profit margin as a proportion of either gross development value or costs is motivated by two factors. First, in practice, profit margins for development projects are difficult to robustly evaluate and justify as they are likely to vary over time, between projects/locations and between developers. Ultimately, the perceived levels of project and market risk are going to be the main determinants of such a context-specific modelling process. Market risk will be determined by the interaction of local and macro-economic performance and the capital markets and project risk will be determined by any factors including the nature of a given site, planning status, size, and complexity of scheme. By contrast the IRR approach allows us to make more meaningful comparisons between development proposals without having to invoke a range of questionable second order assumptions, for example, about how a scheme may be financed. This is also cognate with the latest guidance provided by the RICS (2019). Second, there is increasing evidence that developers employ the IRR approach in their decision-making with indicative rates that suggest our assumed 15% is not unreasonable (Crosby, Devaney and Wyatt, 2019).

How are land values under the existing system and IL estimated?

2.35 An underlying presumption of the modelling exercise is that every £1 of developer contribution is transmitted to a £1 reduction in land value. For the current regime, where not already monetised, developer contributions are expressed in terms of their monetary value. A complicating factor is that a current agreement to pay £1 in future does not have the same value as £1 today. Typically, the further that £1 is received in the future, the lower its value relative to that of £1 today – the well-established 'time value of capital'. This observation is particularly relevant when comparing the proposed IL regime with the current S106/CIL regime. Since CIL tends to be received prior to construction and IL is envisioned to be payable after construction, an expected £1 receipt from CIL and IL in the future will have different present values and affect land values differently.

2.36 Turning to IL, the amount payable is calculated as a proportion of the difference between the expected sale revenue (commonly termed Gross Development Value) minus the minimum threshold.

2.37 The minimum threshold is the sum of the main non-land construction-related development costs (base build costs, site preparation costs, costs of external works, professional fees and contingency allowance). The Existing Use Value is also included in the calculation of the minimum threshold. In the modelling, these values are expressed in terms of £/m² of sellable space developed.

2.38 The minimum threshold represents most of the non-land development costs. Whilst the difference between the minimum threshold and the expected sale price approximately represents the surplus available for value capture, it omits some minor costs such as land acquisition taxes and sales and marketing costs. More fundamentally, it also does not account for the developer's return and a premium to the landowner above Existing Use Value. As a result, the levy rate will not explicitly represent a proportion of the land value uplift.

2.39 The calculation is illustrated below. Making the hypothetical assumption that an IL rate is set locally at 50% and the minimum threshold is £1,500/m², in an area where the typical new build price is £4,000/m², the expected cash payment from the IL will be:

$$(£4,000 - £1,500) * 0.5 = £1,250/m^2$$

2.40 This £1,250 is then expected to be distributed between affordable housing provision and cash payments to the local authority. If say, 60% of the IL is allocated to affordable housing provision, the quantity of affordable housing that is provided will depend on the tenure mix of the affordable housing and the amounts paid by registered providers. Tenure mix will be the variable over which the local authority has some discretion and is likely to vary between local authorities. In the modelling, identical affordable housing contributions are assumed to compare different regimes.

2.41 In order to assess whether an IL is viable, there needs to be some judgement about what constitutes viability. Since there is interdependence between developer returns, land prices and the amount of value capture, there is a risk of the much-repeated issue of circularity that has been an issue when testing CIL, affordable housing policies etc. These interdependencies in the equations below illustrate how the proceeds of a development can be distributed.

- GDV = Land costs + non-land development costs + developer contributions + developer’s profit
- Land value = GDV – (Non-land development costs + developer contributions + developer’s profit)
- Developer’s profit = GDV – (Non-land development costs + developer contributions + land costs)
- Developer contributions = GDV – (Non-land development costs + land costs + developer’s profit)

2.42 The test of viability used in the existing CIL and S106 regime essentially estimates whether the residual land value estimate modelled is sufficient to provide a sufficient surplus above the land value for the existing use to incentivise landowners to sell the land for development. It is not proposed here to go over the longstanding and ongoing debate about the challenges in finding an operational definition of this benchmark and what constitutes a ‘sufficient surplus’ in this context.

2.43 Any assessment of the viability of an IL rate will require an explicit judgement about the appropriate return to the landowner and the appropriate return to the developer. Given the interdependencies between the variables, all need to be fixed before one can be established. For instance, if the question is “Is a 50% levy rate viable?”, all the other variables need to be estimated and a judgement needs then to be made whether the resultant land value is sufficient to incentivise landowners. Alternatively, if the question is “How much land value is captured if a 50% levy rate is imposed?”, the land value assuming no developer contributions can be compared with the land value with a 50% IL rate. The best way of understanding how these questions are handled in the modelling is through a worked example.

A worked example

2.44 In this final section of Chapter 2 we perform a worked model of a hypothetical site to illustrate both the process by which the modelling has been undertaken and to establish the format by which research findings are reported throughout this report.

2.45 In this worked example we assume a greenfield site currently in agricultural use where the average new build sale price for residential housing is close to the national average at £3,000/m^2. Base build costs are £1,300 m^2. We take account of the typical bundle of other ‘normal’ construction costs (site preparation, professional fees, contingency allowance, and external works) based on local evidence to produce a total construction cost of £1,665 m^2. These construction costs constitute the non-land development costs with most[3] of the residual between the expected costs and revenues (£1,335 m^2) available for developer’s profit, developer contributions and payments to the landowner.

2.46 It is intended that the proposed Infrastructure Levy will apply to the difference between a Minimum Threshold (reflecting existing use value and the aggregate costs of development) and the Gross Development Value (this is effectively the expected revenue).

2.47 In the worked example the Existing Use Value is low with agricultural land selling for c. £20,000 per hectare. For a project involving the development of 90 residential units of 100 m^2 on a five-hectare site (gross development area) producing a net development area of three hectares, the EUV of the land in agricultural use equates to just over £11[4] in term of m^2 of new development.

2.48 This figure is calculated by dividing the total EUV of the site of £100,000 (five hectares * £20,000) by the total area of the development 9,000 m^2 (90

[3] There are some other relatively minor costs that are paid out of this sum. They include the transaction costs of purchasing the land and the sale and marketing costs of selling the completed dwellings.
[4] Existing Use Values will tend to be much higher for some brownfield sites. For instance, industrial land in Greater London can be worth £6 million per hectare. For a one-hectare site with capacity for 40 dwellings per hectare with an average size of 70 m^2, the EUV would be £214 m^2.

dwellings *100 m^2 per dwelling). This produces a Minimum Threshold of £1,676 m^2. This would leave £1,324 m^2 (£3,000 - £1,676) that could be subject to the Infrastructure Levy Rate. However, appropriate returns would have to be provided to the developer and the landowner out of this 'surplus' which will entail an engagement with the concept of Benchmark Land Value.

2.49 Similar to practice in viability testing, the approach taken in the modelling exercise is to assess whether, having made appropriate allowances for developer's profit, the estimated residual land value is sufficient to provide an incentive for the landowner to sell the land. The estimation of an appropriate incentive for the landowner has been and remains highly contested. For this site, as is common in mainstream viability modelling, it is assumed that ten times agricultural value is the Benchmark Land Value.

2.50 Assuming a target rate of return of 15% per annum to the developer, land values can be estimated for three scenarios.

1. 'Policy off': This estimates the land value assumes that no developer contributions are made.
2. Current policy: This estimates the land value assuming that the current CIL/S106 policy is in place.
3. Proposed policy: This estimates the land value assuming that an alternative policy applying an Infrastructure Levy is in place.

2.51 In this hypothetical example, it is assumed that, under the current policy regime, the local authority policy is that 30% of dwellings should be affordable of which:

- 15% will be social rented and are expected to be sold at 40% of Market Value (£1,200 m^2).
- 7.5% will be affordable rented and are expected to be sold at 60% of Market Value (£1,800 m^2).
- 7.5% will be shared ownership and are expected to be sold at 70% of Market Value (£2,100 m^2).

2.52 In addition to affordable housing contributions, this (hypothetically) non-CIL charging local authority obtains an equivalent of £10,000 per dwelling (£100 m^2) as additional S106 contributions. The value of affordable housing discounts heavily outweighs the additional S106 contributions. The value of the discounts equates to £427 m^2 of the scheme representing c. 81% of the total developer contributions.

2.53 The estimated land value for the site without any developer contributions is £1,554,063 per hectare of gross developable area. Taking the Existing Use Value of £20,000 per hectare into account, this represents an uplift

£1,534,063. For a total required investment of £2,099,675 per hectare of gross developable area, in return the developer is estimated to receive an IRR of 15% per annum, a Return on Capital Employed of 29% and a profit margin on Gross Development Value of 11.43%[5].

2.54 When the revenue reductions due to affordable housing and the costs of S106 contributions are included in the financial appraisal, the estimated land value falls to £863,513 per hectare of gross developable area. This represents a reduction in estimated land value of £690,550 which is 45.01% of the land value uplift assuming no developer contributions. This can be interpreted as the proportion of land value capture.

2.55 Turning to the developer's estimated financial performance, due to lower land costs the required investment per hectare of gross developable area is reduced to £1,542,168. In return, the developer is estimated to receive an IRR of 15% per annum, a Return on Capital Employed of 27% and a profit margin on Gross Development Value 9.08%.

2.56 In order to produce a comparable analysis for the proposed IL, it is necessary to make several assumptions including essential aspects such as a levy rate to be modelled and the scale of affordable housing contributions required. These assumptions will be central to future policy formation in practice.

2.57 In this document we provide both a lower bound estimate of a rate for IL that would be equivalent to the scale of developer contributions exacted under a policy compliant implementation of the existing system and an upper bound that is reflective of the maximum value that the IL could take whilst maintaining development viability (defined as the return to the developer of 15% IRR) and benchmark land value. In addition to this range of values that might conceivably be taken we also arbitrarily model a hypothetical IL rate of 50%. In keeping with this assumption of a policy-compliant implementation of the existing system we assume throughout this document that local authorities maintain the same affordable housing policy regime as is currently in place. This enables the effect of different levy rates to be isolated and analysed in the sensitivity tables that accompany the full account of the modelling work set out in Appendix 1.

2.58 For the purposes of this work example, at the hypothetical 50% Levy Rate, the total amount payable/m^2 would be:

$$(£3,000 - £1,675) * 0.5 = £662\ m^2$$

[5] There is a discrepancy in the profit margins as a % of GDV in the chart and in the text. In the chart, the profit margin as a % of GDV is reported based on the GDV without adjustment for affordable housing (£3,000 m^2) for all three policy regimes. In the text, the profit margin as a % of GDV represents the profit margin as a % of GDV adjusted for affordable housing discounts. The latter is the most common calculation of GDV in practice. However, in the context of the chart, it does not allow for consistency in illustrating how the value created from the project is distributed.

2.59 However, the affordable housing contributions of £427 m^2 would be offset against this figure. So, assuming a Levy Rate of 50%, the affordable housing contributions would represent 64% of the total revenue raised from the IL.

2.60 Assuming a Levy Rate of 50%, when the revenue reductions and costs due to IL are included in the financial appraisal, the estimated land value falls to £716,706 per hectare of gross developable area. This represents a reduction in estimated land value of £837,357 per hectare which is 54.6% of the land value uplift assuming no developer contributions. Turning to the developer's estimated financial performance, due to even lower land costs the required investment is further reduced to £1,205,378. In return, the developer is estimated to receive an IRR of 15% per annum, a Return on Capital Employed of 28% and a profit margin on Gross Development Value of 7.21%.

2.61 The Levy Rate was calculated that would produce the same land value capture percentage as the current policy regime. In addition, it was possible to calculate a 'ceiling' Levy Rate representing the maximum Levy Rate that would be viable if the landowner were to sell the land at the estimated Benchmark Land Value. In this case, a Levy Rate of 43.6% would produce the same proportion of land value capture as the current policy regime - 45.01%.

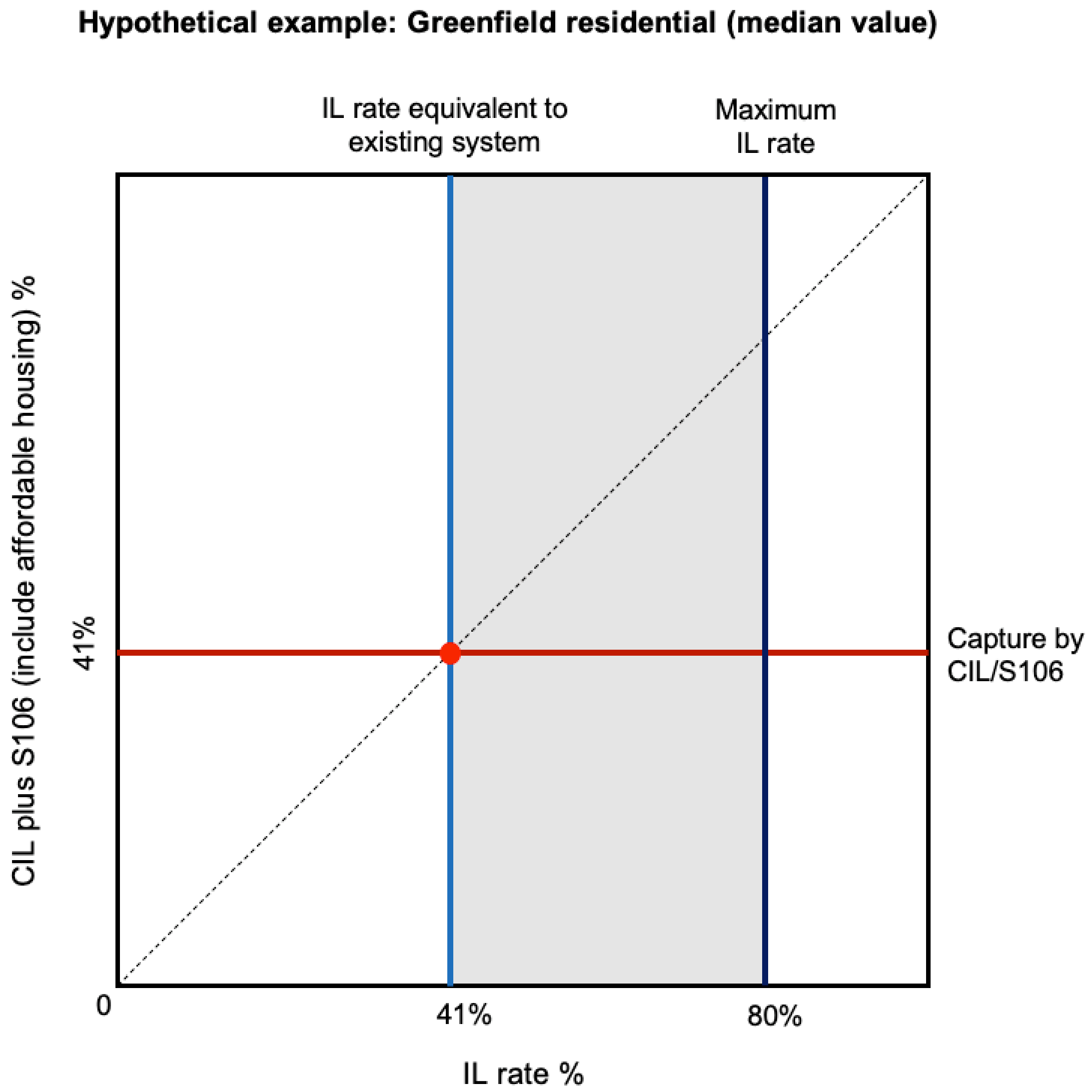
2.62 If the landowner were to sell the land for £200,000 per hectare, it is estimated that the maximum viable Levy Rate would be 81%. Given that the current policy regime produces land values of over £850,000 per hectare of gross developable area, imposing the maximum Levy Rate would be likely to fundamentally change and potentially disrupt the operation of the land market.

Presenting model findings

2.63 For each model we produce summary statistics and diagrams. These include an IL 'window' diagram which describes the estimated range of values between the lower and upper bounds that IL might conceivably take, a full account of model outputs, and a visual three-way comparison of how the components of GDV are affected under the three different scenarios: a policy free environment, the policy-compliant existing system and the IL modelled at an arbitrary, hypothetical rate of 50%.

2.64 The first reported model outcome throughout Appendix 1 is the 'window' diagram. Figure 2.5 illustrates this representation of the estimated lower and upper bounds that the IL might take in the worked example discussed in this chapter.

Figure 2.5: IL 'window' diagram for 'worked example'



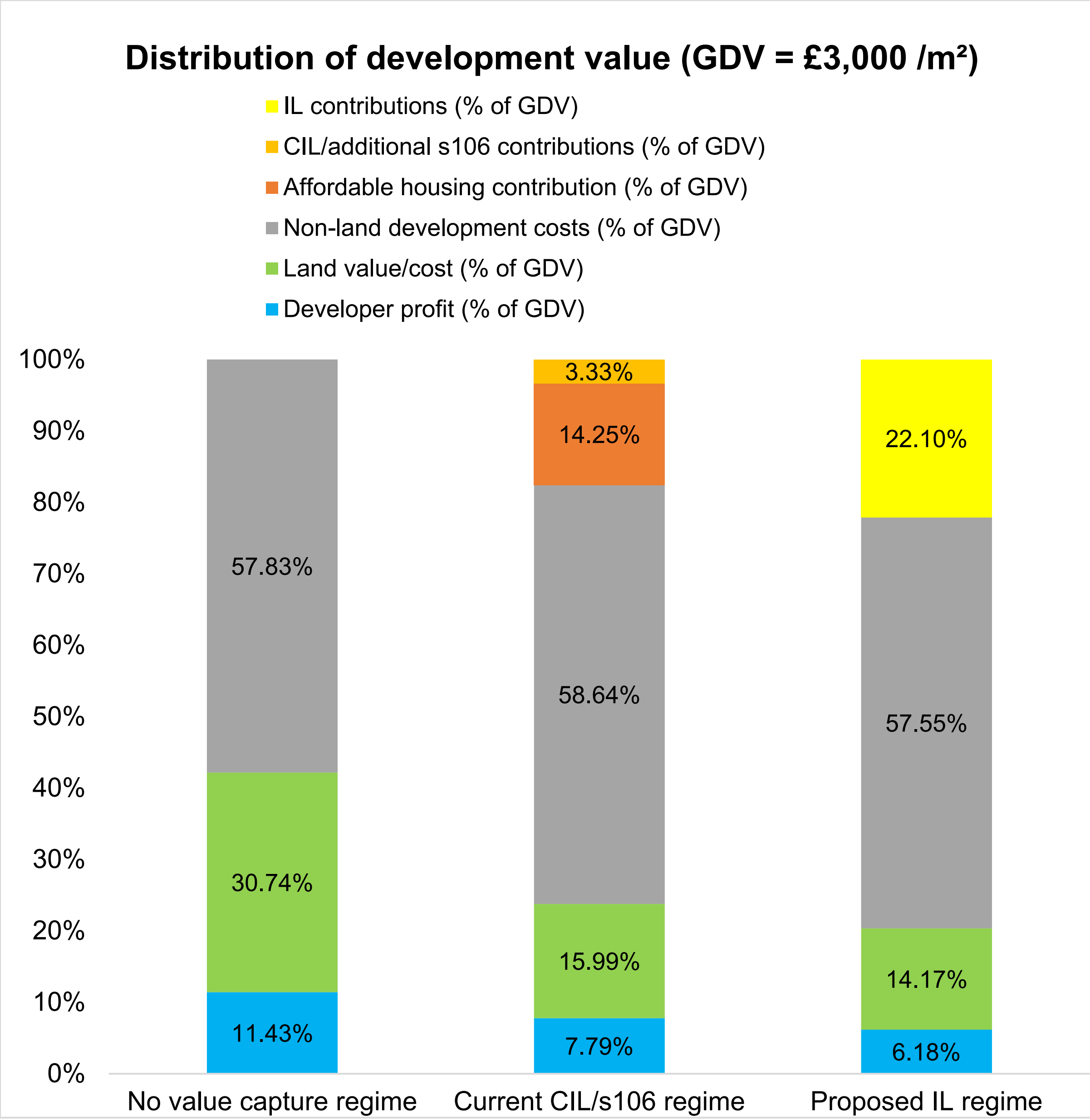
2.65 In addition to the window diagram we report a full set of commonly employed measures of development performance and investment appraisal for each model under the three modelled scenarios (a policy-free environment, the implementation of the existing S106/CIL system in conformity with local policy requirements and the IL set at an arbitrary, hypothetical rate of 50%). Table 2.3 provides this set of measures for the worked example in this chapter before Figure 2.6 represents the effect on the distribution of GDV under the same three scenarios. All three visual representations are included for each model in Appendix 1.

Table 2.3: Detailed model outputs for the 'worked example'

Key outputs	No LVC	CIL/S106	IL
GDV £ /m²	£3,000	£3,000	£3,000
Value of affordable housing discount (£ /m² of scheme area)	£0	£427	£427
CIL/S106 (£/m² of scheme area)	£0	£100	£0
Gross IL (£/m² of scheme area)	£0	£0	£662
Net of affordable housing IL (£ /m² of scheme area)	£0	£0	£235
Affordable housing discounts as a % of value capture	n/a	81%	64%
Estimated land value (£/m² of NDA)	£259	£144	£119
Estimated land value (£/ha NDA)	£2,590,104	£1,439,188	£1,194,510
Estimated land value (£/ha GDA)	£1,554,063	£863,513	£716,706
Estimated total uplift above EUV (£/m² of NDA)	£256	£141	£116
Land value uplift captured (£/m² of NDA)	£0	£115	£140
% total uplift captured	0%	45.01%	54.58%
Total developer investment (£)	£10,498,377	£7,710,840	£6,026,891
Estimated developer profit from project (£)	£3,086,276	£2,103,266	£1,668,218
Developer profit (£ /m² of scheme area)	£343	£234	£185
Profit margin (% of GDV)	11.43%	9.08%	7.21%
Profit margin (% of development costs)	12.91%	9.99%	7.85%
ROCE	29.40%	27.28%	27.68%
Equity multiple	1.29	1.27	1.28
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/106)	41%		
IL Rate (£/m²) (equivalent to current CIL/106)	£548		
Maximum Viable IL Rate (%)	80%		
Maximum Viable IL Rate (£/m²)	£1,066		

Source: Authors' calculations

Figure 2.6: The distribution of GDV under the three scenarios for the 'worked example'



Source: Authors' calculations

Case study qualitative insights into the potential operationalisation of the Infrastructure Levy

2.66 In addition to all the quantitative modelling work, this research also reports on qualitative engagement with the six case study local authorities. This aspect of the research supported both the detailed modelling of the potential IL in different housing and development contexts across England, and simultaneously the opportunity to engage with a subset of knowledgeable local authority officers. This engagement with local authority officers supported three core aspects of the project.

2.67 First, the respective officers from the local authority case studies provided access to key documents and evidence to support the modelling work. This included evidence such as the Local Plan, CIL charging schedules and evidence, sub-authority housing need estimates, housing delivery modelling, and analysis of existing developer contributions.

2.68 Second, the modelling and outputs were presented to the local authority officers for sense-checking and critique. Their views informed revised versions of the modelling. Their views are reported in Chapter 5 of this report.

2.69 Third, through open-ended interviews, the officers provided their views on the potential operationalisation of the IL. As the IL is likely to be determined locally by authorities, there is the potential for variations in local practice to determine the rate and operation of the levy. As such, we gathered officers' views from the six case studies on how the IL charging schedule might be locally determined (for example, how the authorities might approach collecting the necessary data and determining the geography and value of the levy) and of the impact of the IL on development activity across the authority area.

2.70 This chapter has provided an overview of the case study approach to the research, the methods, data and key considerations for interpreting the quantitative modelling of the IL and the methods employed to understand the approaches that case study authorities might undertake to implementing and operating the IL. In Chapter 3 a summary and analysis of key model findings is presented based upon the detailed account of all modelling work undertaken as part of this research contained in Appendix 1.

Chapter 3: Model findings and analysis

Key findings

- This chapter presents a comprehensive overview and analysis of the model results which are reported fully in Appendix 1. The principal finding of this aspect of the work is the identification of four categories of development regarding the hypothetical operation of the IL:
- Developments where local authorities may have significant flexibility in determining a rate between estimated lower and upper bounds that define the range of values at which the IL might be set. Uncomplicated greenfield developments in areas characterised by a strong property market are the best example of this development type.
- Developments where local authority discretion over the rate at which the IL might be set is quite constrained. The brownfield developments modelled as part of this research are the best example of this development type.
- Developments that would previously have been outside the system of developer contributions, but which would become liable under the proposed IL. Purpose built student accommodation and warehousing models are the best examples of this development type.
- Developments where the existing system (represented by the estimated lower bound) produces outcomes that are more than the estimated upper bound rate that the IL could take. There are four such anomalous examples where this ‘negative window’ can be identified. This implies that the policy-compliant existing system as modelled secures a greater level of developer contributions than the estimated upper bound for the IL would achieve. The most likely explanation here is that local policy requirements represent an unrealistic expectation of what a development of the types modelled might achieve in practice and would correspondingly be revised downwards through the S106 process.
- Finally, it should be noted that the estimated lower and upper bounds reported in this document are predicated on some important assumptions.
- First, the lower bound’s synchronisation with a policy-compliant version of the existing system is an idealised version of the results of S106 and CIL in operation: some local authorities may routinely not achieve policy compliant outcomes. In instances where local authorities are in practice currently achieving lower levels of developer contribution than modelled, understanding the rationale and context for this practice is crucial to understanding the true lower bound that the IL might take.
- Second, the upper bound provides an estimate of the maximum value the IL could take whilst preserving development viability and the Benchmark Land Value. However, there is very little research on the degree to which BLV represents an adequate incentive for landowners to release land for development: should BLV be an underestimate the upper bound for the IL would correspondingly be lower.

Introduction

3.1 In this chapter we seek to provide a comprehensive account of the twenty-four development types for which full modelling details are contained in Appendix 1.

3.2 Table 3.1 provides an overview of the full set of twenty-four models together with details of the IL 'window' - the estimated lower and upper bound values that the modelling work would suggest the IL could be set for each individual development type.

3.3 The compiled results for all twenty-four models set out in Table 3.1 can sensibly be understood as comprising four separate categories of findings:

i. A 'wide' IL window where local authorities may have significant flexibility in determining a rate between the estimated lower and upper bounds. The greenfield developments are the best example of this development type.

ii. A 'narrow' IL window where local discretion over the rate at which the IL might be set would be quite constrained. The brownfield developments are the best example of this development type.

iii. Models of development that would previously have been outside the system of developer contributions, but which would become liable under the proposed IL. Purpose built student accommodation and warehousing models are the best examples of this development type.

iv. Models where the existing system (represented by the estimated lower bound) produces outcomes that exceed the estimated upper bound rate that the IL could take. There are four such anomalous examples where this 'negative window' can be identified.

3.4 Over the course of this chapter we consider each of these four separate categories.

Table 3.1: The twenty-four development models and the IL 'window' for each

			IL 'window'	
		Scheme value (£/m²)	Estimated lower bound	Estimated upper bound
Model A1	Greenfield residential	£7,150	34%	91%
Model A2	Brownfield residential	£7,150	41%	63%
Model A3	Brownfield residential	£6,200	48%	53%
Model A4	Permitted development office-to-residential	£8,000	0%	9%
Model B1	Greenfield residential	£4,100	33%	88%
Model B2	Brownfield residential*	£4,000	33%	31%
Model B3	Brownfield build-to-rent*	£4,038	29%	18%
Model B4	Purpose-build student accommodation	£4,000	9%	67%
Model C1	Greenfield residential	£4,200	32%	89%
Model C2	Greenfield residential	£3,600	39%	86%
Model C3	Greenfield residential	£3,200	43%	82%
Model C4	Strategic urban extension	£3,500	40%	79%
Model D1	Greenfield residential	£3,300	33%	84%
Model D2	Greenfield residential	£2,600	42%	75%
Model D3	Greenfield residential*	£2,100	65%	49%
Model D4	Warehouse scheme	£1,729	0%	54%
Model E1	Greenfield residential	£3,000	32%	88%
Model E2	Greenfield residential	£2,500	25%	87%
Model E3	Greenfield residential	£2,000	25%	83%
Model E4	Warehouse scheme	£1,482	0%	24%
Model F1	Greenfield residential	£2,900	20%	81%
Model F2	Greenfield residential	£2,600	27%	69%
Model F3	Greenfield residential*	£1,800	42%	4%
Model F4	Warehouse scheme	£1,482	0%	24%

*These models have a 'negative window' where the estimated upper bound is lower than the estimated lower bound. These anomalies are discussed in Section 3.83.

The 'wide' window

3.5 The majority of the development types that local authorities requested to be modelled were residential developments on greenfield sites - fifteen of the twenty-four. Table 3.1 illustrates that, in most of these cases, the IL could be set at a range of values between the estimated lower bound (the equivalent scale of developer contributions to those that would be achieved under a policy-compliant existing system) and the estimated upper bound (the maximum IL rate that could be applied whilst maintaining Benchmark Land Value).

3.6 In some instances the range of values that IL could take is very wide. The most extreme example of this is Model E2 where there are 62 percentage points between the lower and upper bounds (25% - 87%). In total ten of the 24 developments modelled have a window of more than 50 percentage points between the lower and upper bounds (A1, B1, B4, C1, D1, D4, E1, E2, E3, F1).

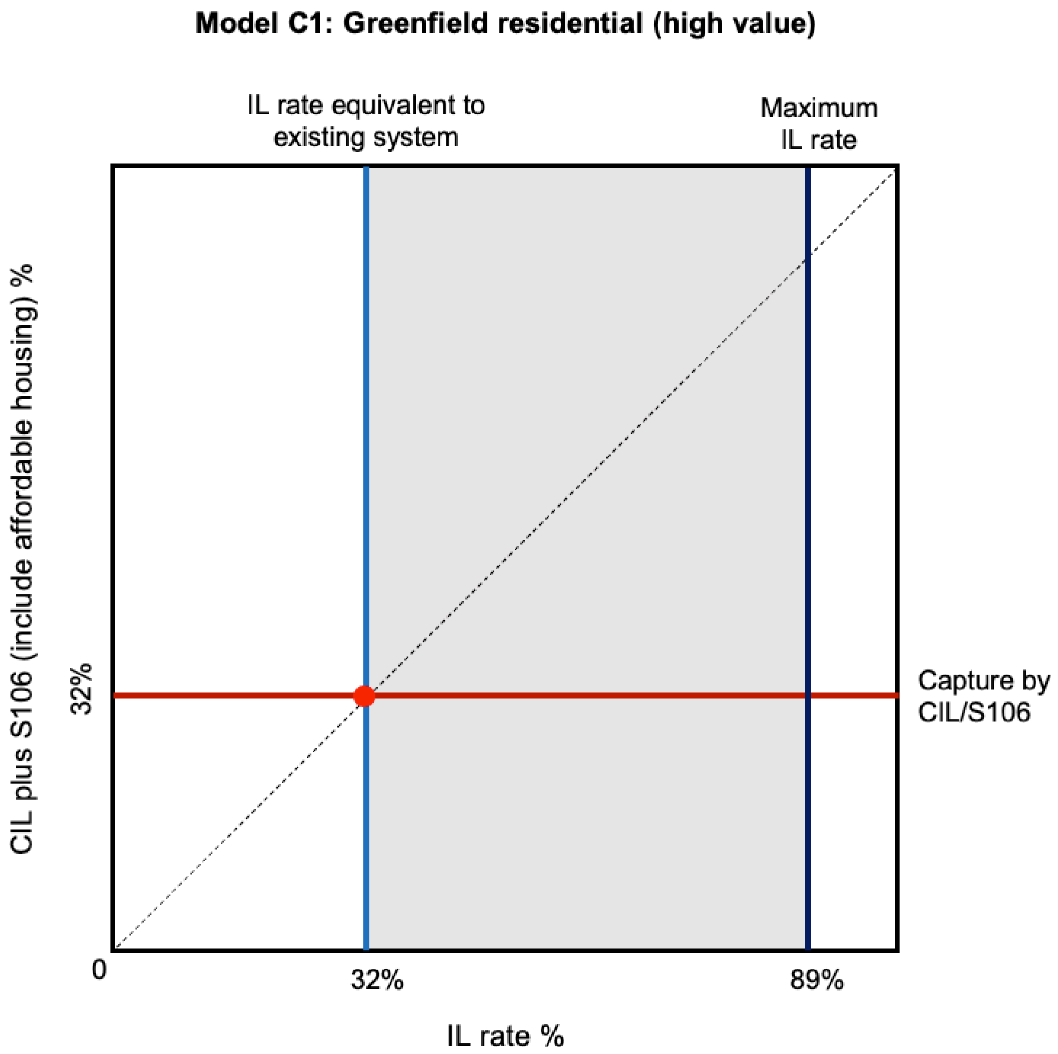
Greenfield development

3.7 In general greenfield developments have the 'widest' window. Fifteen of the models summarised in Table 3.1 describe residential developments in greenfield settings (14 are explicitly greenfield, plus the Strategic Urban Extension which is assumed to be a greenfield development). Of this set 13 show a range of values that the IL could take that span between 33 percentage points (D2) and the 62 percentage points noted above for E2. The mean window for these twelve greenfield developments is 50 percentage points.

3.8 A good indicator of this development type is model C1, a greenfield development occupying a five-hectare site (gross development area) in a higher value setting (in the context of the local authority in question). The modelled development would provide a mixture of low-density apartments and single-family homes. Model outputs for C1 suggest an estimated lower bound equivalent to the policy-compliant existing system of 32% and an estimated upper bound of 89%. This estimated upper bound is dependent upon a range of modelling assumptions such as the preservation of benchmark land value at £200,000/ha – if the true value of BLV necessary to incentivise land release is greater than £200,000/ha the estimated upper bound will correspondingly be lower.

3.9 Given the principles and assumptions necessary to create the development models set out in Appendix 1 it is possible to define an implied 'window' of values between these estimated upper and lower bounds that are set out in Figure 3.1. An equivalent 'window' diagram is provided in Appendix 1 for each of the 24 modelled developments. Figure 3.1 sets out the window diagram for model C1.

Figure 3.1: The IL 'window' for model C1



3.10 A further way of comparing the existing system and the hypothetical IL is to assign an arbitrary value that the IL could potentially take. Throughout this research we model the potential effects on each development type of the IL rate set at an arbitrary, hypothetical rate of 50%. In the case of model C1 and most of the other greenfield models this is a plausible rate at which the IL could be set locally as it occupies a position within the central range of values that the window diagram would suggest the IL could viably take.

3.11 In four specific examples, discussed later in the chapter, the hypothetical IL rate of 50% is above the estimated upper bound which the modelling would suggest would be possible for IL. Nevertheless, we continue to report the potential effects of the IL at this modelled 50% rate for the sake of consistency and to model the potential outcomes of setting an IL rate at a level that would make development unviable in such cases.

3.12 Figure 3.2 illustrates the potential effects on Gross Development Value (GDV) under three different scenarios: a policy-free environment (the left-hand bar), the existing system of S106/CIL (the central bar) and the IL modelled at the arbitrary, hypothetical rate of 50% (the right-hand bar).

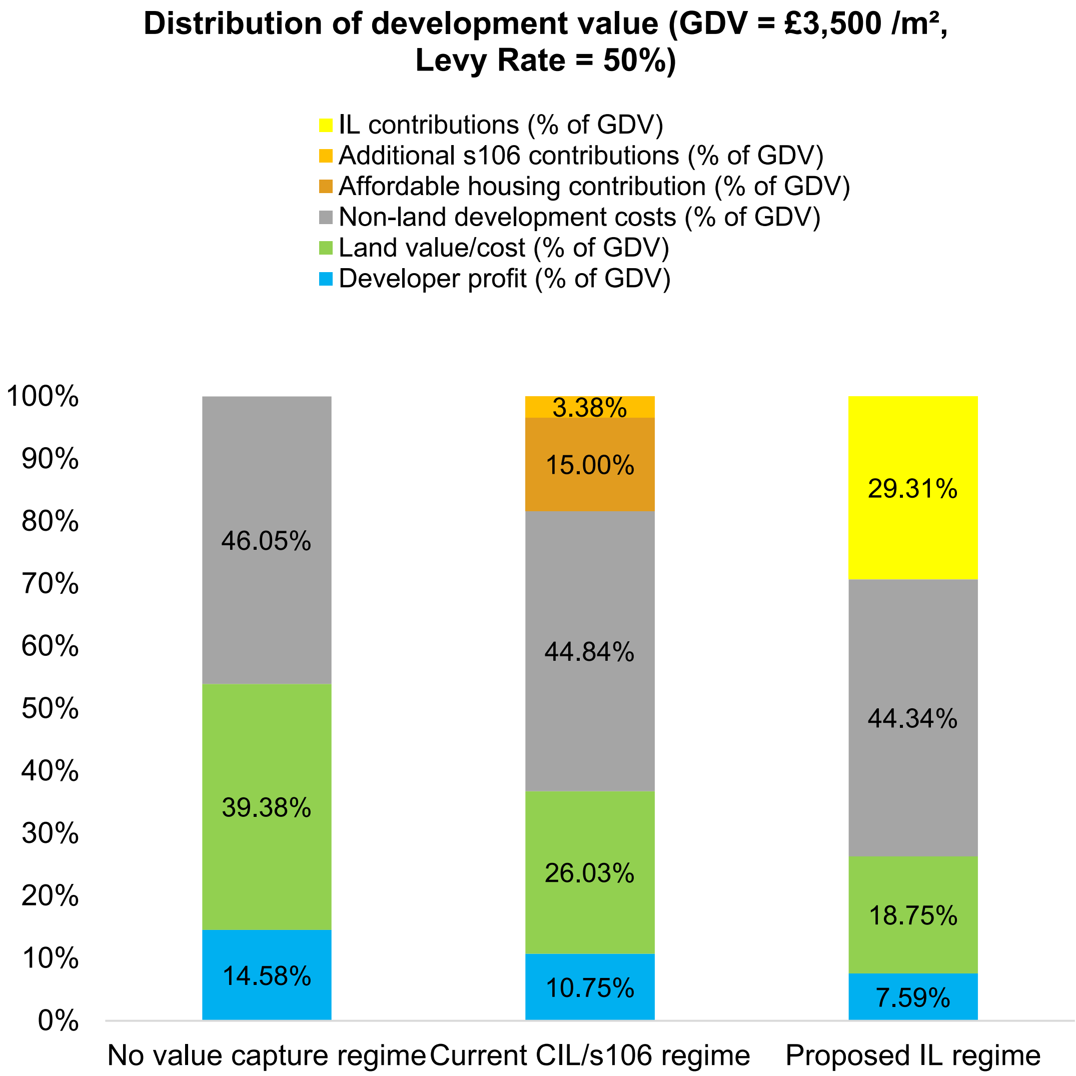


Figure 3.2: A three-way comparison of the distribution of Gross Development Value in **model** C1

Source: Authors'

3.13 The central bar in Figure 3.2 shows a total level of developer contributions achieved under the existing system of 18.38% of which 15% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 3.38% through non-affordable housing S106 contributions (the red shaded area). Case Study C is not a CIL charging authority, so no developer contributions are exacted through this mechanism.

3.14 The IL set at an arbitrarily selected rate of 50% recovers 29.31% of the Gross Development Value (the green shaded area), 10.93% greater than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL in this example, 15% of GDV would go to maintaining levels of affordable housing, leaving 14.31% of GDV available for infrastructure and other public goods.

3.15 Table 3.2 provides full details of all significant model outputs for C1. As with the 'window' diagram in Figure 3.1, equivalent figures and tables to Table 3.2 and Figure 3.2 are provided for each of the 24 modelled developments contained in Appendix 1.

3.16 Assuming the Benchmark Land Value accurately represents the cost of the land, in the case of model C1, there could be scope for developer contributions at or above the levels that the existing system would achieve, assuming policy-compliant outcomes prevailed.

3.17 Similar observations could be made regarding most of the greenfield developments modelled in Appendix A1. This suggests that local authorities would have flexibility to determine IL rates in a manner that is sensitive to development contexts whilst maintaining or potentially growing contributions from sites of this type.

3.18 In these greenfield settings the principal determinant of viability appears to be existing property prices: the greater the value of the existing residential market the higher the estimated upper bound of a consistently wide window of possible IL rates. Similarly, and conversely, as existing property prices decline the narrower the window of modelled values the IL could take becomes. Indeed, the only greenfield development model where there was limited scope for the exaction of developer contributions is in the lowest value market setting (F3) where property prices of £1800/m² resulted in a window defined by an estimated lower bound of 0% and an estimated upper bound of just 4%.

3.19 The balance of findings would support the view that the IL is best suited to securing developer contributions in greenfield settings, particularly where existing property prices are strong.

Table 3.2: Detailed model outputs for model C1

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before AH discounts)	£4,200	£4,200	£4,200
Value of affordable housing discount (£/m² of scheme area)	£0	£630	£630
CIL/S106 (£/m² of scheme area)	£0	£142	£0
Gross IL (£/m² of scheme area)	£0	£0	£1,231
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£601
Affordable housing discounts as a % of value capture	n/a	82%	51%
Estimated land value (£/m² of NDA)	£498	£329	£237
Estimated land value (£/ha NDA)	£4,975,387	£3,288,447	£2,369,341
Estimated land value (£/ha GDA)	£2,985,232	£1,973,068	£1,421,604
Estimated total land value uplift above EUV (£/m² of NDA)	£494	£326	£234
Land value uplift captured (£/m² of NDA)	£0	£169	£261
% of total uplift captured	0%	34.13%	52.73%
Total developer investment (£)	£18,214,415	£14,091,010	£9,864,643
Estimated developer profit from project (£)	£5,524,782	£4,076,158	£2,876,789
Developer profit (£/m² of scheme area)	£612	£452	£319
Profit margin (% of GDV)	14.58%	12.65%	8.93%
Profit margin (% of development costs)	17.06%	14.48%	9.97%
ROCE	30.33%	28.93%	29.16%
Equity multiple	1.30	1.29	1.29
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	32%		
IL Rate (£ /m²) (equivalent to current CIL/S106)	£793		
Maximum Viable IL Rate (%)	89%		
Maximum Viable IL Rate (£/m²)	£2,183		

Source: Authors'

The 'narrow' IL window

3.20 The models with the smallest difference between the estimated lower and upper bounds were brownfield developments. Local authorities requested fewer brownfield developments to be modelled than greenfield. One of the reasons that local authorities gave for prioritising greenfield modelling was the perception that higher receipts are routinely achieved on greenfield sites in comparison to brownfield under the existing system. This was particularly the case in local authorities with generally lower prevailing property prices.

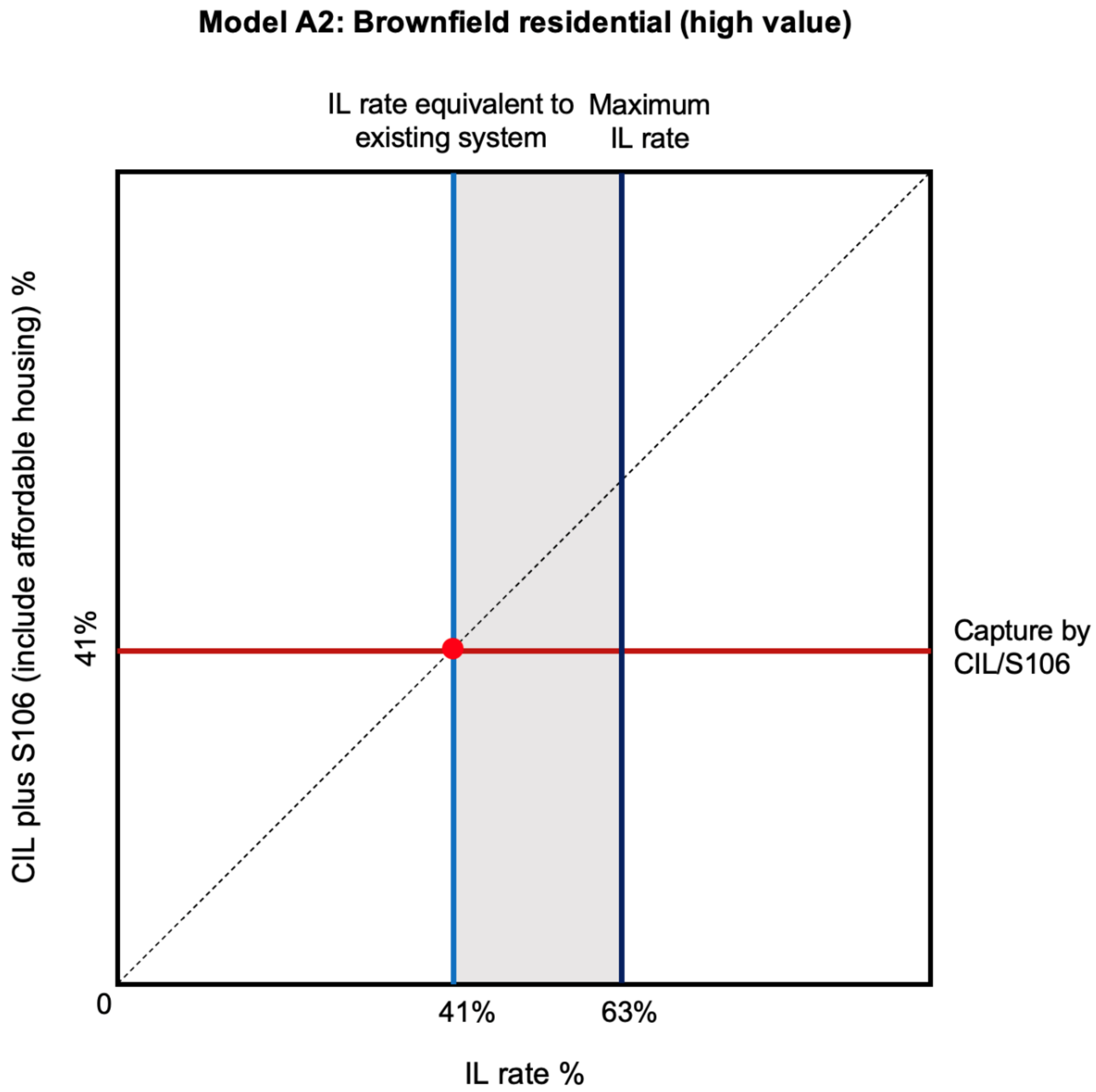
3.14 Two of the six case study authorities, A and B, requested modelling work for brownfield residential schemes (A2, A3, B2, B3), an office-to-residential scheme delivered under permitted development rights (A4) and a purpose-built student accommodation scheme (B4). These last two schemes would both be implicitly inner-urban, brownfield developments. However, A4 and B4 are considered separately from section 3.23 onwards as they represent development types that would be effectively partly or wholly outside the existing system of developer contributions.

3.15 The key message from the brownfield sites can be illustrated by contrasting two similar residential schemes from Case Study A where the principal variation is the difference in land values from a high value setting (£7,150/m²) in model A2 to a relatively lower value setting (£6,200/m²) in model A3.

3.16 Figures 3.3 and 3.4 provide an illustrative account of the range of values that the IL might take in these two settings.

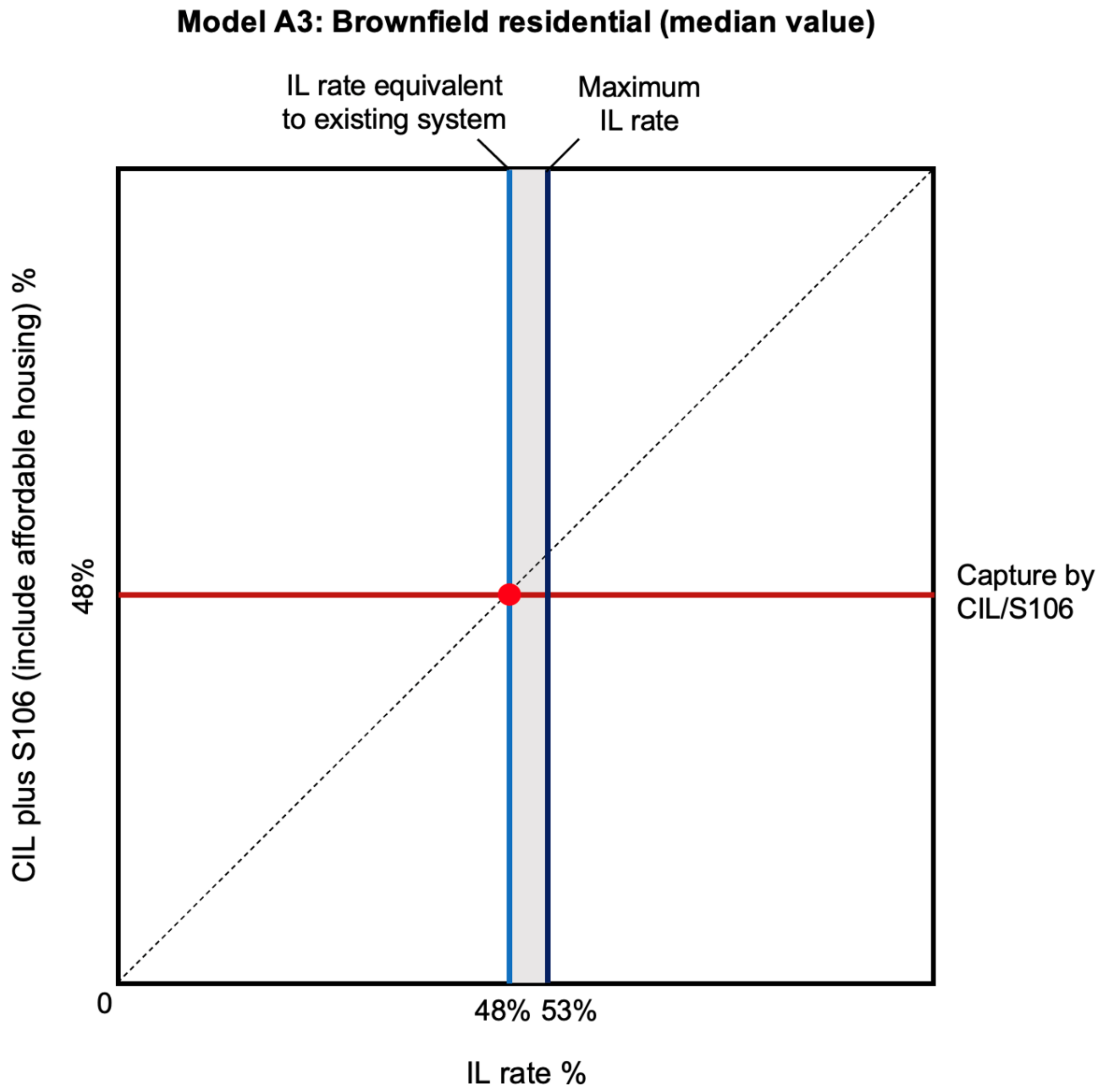
3.17 The narrower window in Figure 3.4 when compared to Figure 3.3 is caused by the lower prevailing property prices in model A3. The flexibility of the IL to be set at different rates is, therefore, partly a function of the local market context: in high values settings such as A2 the window of values that the IL could take is sufficiently wide to afford local policy makers considerable discretion over the IL rate that might be considered appropriate. By contrast, in relatively weaker housing markets, such as A3, the window of values that the IL might take is significantly narrowed. Local policy makers would correspondingly be far more constrained in their discretion over the determination of the IL rate. Cases such as A3, and more so in lower property price contexts, suggest the limited option of setting an IL rate that is close to simply maintaining existing outcomes (with the significant assumption that current local outcomes are genuinely policy-compliant).

Figure 3.3: The IL ‘window’ for model A2



Source: Authors’

Figure 3.4: The IL 'window' for model A3



Source: Authors'

3.18 A good exemplar of sites with limited potential for developer contributions can be found in model F3. This greenfield residential development in a lower value setting has an estimated upper bound for the IL of 4%. In the case of F3 (along with B2, B3 and D3), the estimated upper bound for the rate that the IL could take exceeds the lower bound value equivalent to the policy-compliant operation of the existing system. The existence of this 'negative window' reinforces the finding that the potential to exact developer contributions in brownfield and lower value settings is even more limited than the scale required by local policy under the existing system. This phenomenon is discussed further at section 3.39.

3.19 A significant reason for the much more limited potential for developer contributions in brownfield settings are the higher costs associated with property development in such contexts. For each m² of new space developed, high density projects on brownfield sites tend to have significantly higher non-land development costs compared to low density schemes. This is because:

- brownfield sites tend to be more complex with higher build costs.
- high density, tall buildings tend to have higher build costs per unit of space.
- the presence of internal common areas requires a greater area to be constructed than is available to be sold.
- since the sites typically have existing or previous commercial uses, Existing Use Values tend to be higher; and
- revenues tend to be received only after construction of the whole scheme is completed.

3.20 When compared to greenfield sites, the modelled result for high density brownfield sites tends to require higher Minimum Thresholds with less scope for land value capture. It is also worth noting that brownfield sites are likely to be more heterogeneous than greenfield sites - they can have a range of existing and alternative commercial uses.

3.21 For the reasons outlined above the IL window in the modelled brownfield contexts is generally narrower than in greenfield settings. In the highest value areas such as that modelled in A2 the window is sufficiently wide to provide local authorities with some flexibility regarding the parameters within which the IL could be conceivably set. By contrast, as average per £/m² house prices decline the window correspondingly narrows significantly – there are just 5 percentage points between the estimated lower bound (equivalent to the policy compliant existing system) and upper bound (the notional maximum rate that the IL could take) in model A3.

3.22 The conclusion of this finding is clear: the scope for developer contributions to be exacted on residential brownfield sites is quite significantly constrained to the highest value settings. As real estate values decline, the scope for local authorities to manage the IL flexibly diminishes; only values close to or below the existing system's policy-compliant level of required contributions is consistent with development viability in brownfield sites characterised by lower values.

Development that was previously outside the system of developer contributions

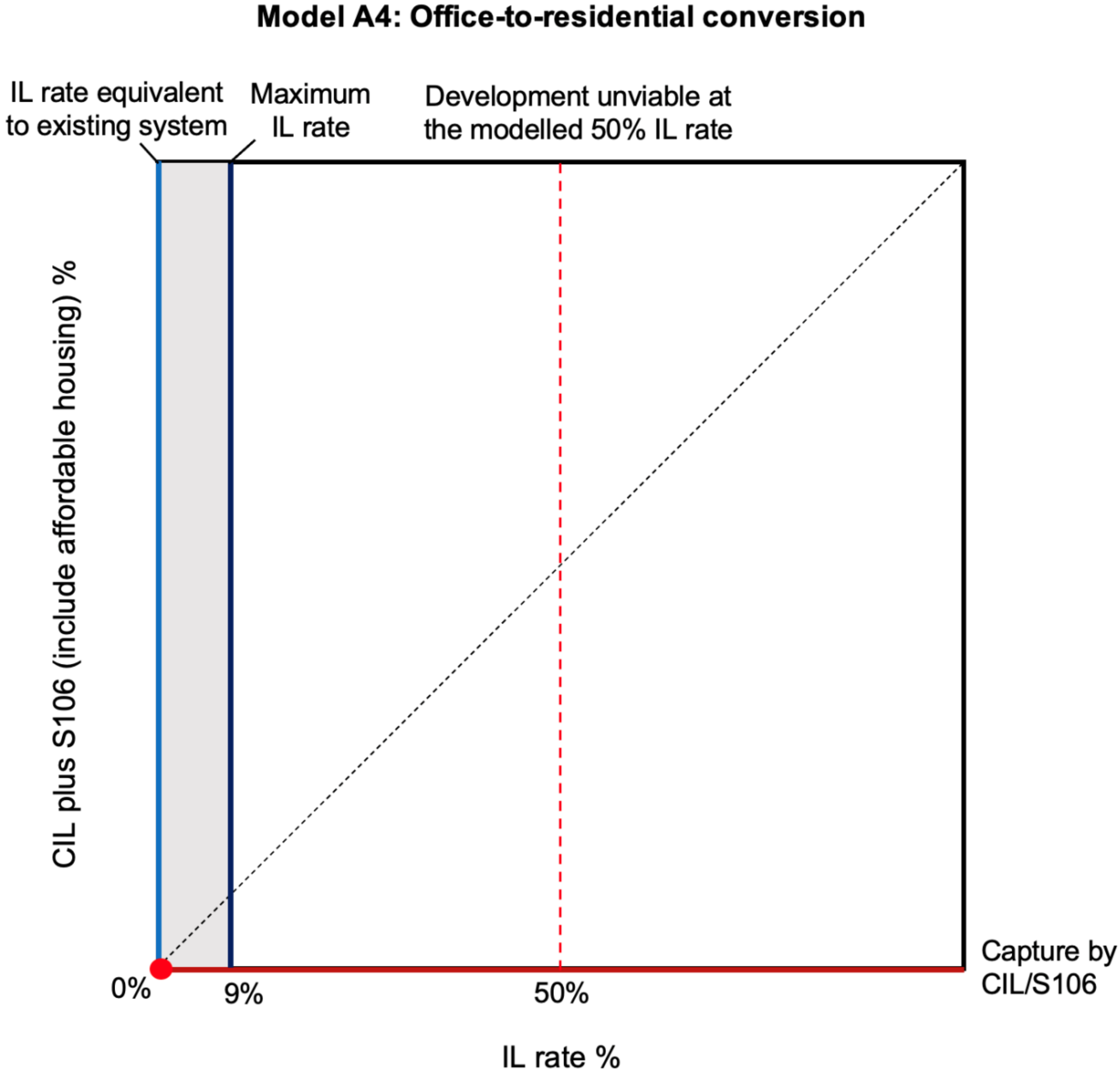
3.23 Brownfield and greenfield residential development jointly account for 19 of the models (15 greenfield, four brownfield). The remaining five models are comprised of three warehouse developments (D4, E4 and F4), an office-to-residential permitted development rights scheme (A3) and purpose-built student accommodation (B4). Considering each in turn:

Permitted development

3.24 Although the permitted development scheme modelled as A4 would be, by definition, likely to occur in a brownfield setting it is sensible to consider it separately alongside warehousing and student accommodation as PD schemes have historically been (largely) outside the scope of developer contributions.

3.25 In the case of A4 the office-to-residential scheme modelled has an estimated upper bound for the IL of just 9%. The principal reason for the limited potential for developer contributions to be exacted on developments of this type are the high costs associated with conversion of an existing building to residential use. Figure 3.5 illustrates the estimated lower and upper bounds that define the window of values at which the IL might be set regarding this development:

Figure 3.5: The IL 'window' for model A4



Source: Authors'

3.26 As this scheme would effectively be outside the scope of the existing system of developer contributions the lower bound that would be equivalent to the existing system is equal to zero. However, the upper bound level implies that the estimated maximum level at which the IL could be viably set is just 9%. This very narrow window of possibility for the IL, illustrated in Figure 3.5, results from the significant scale of the conversion costs associated with development of this type. This finding, again, reinforces the limited scope for developer contributions to be exacted in brownfield settings.

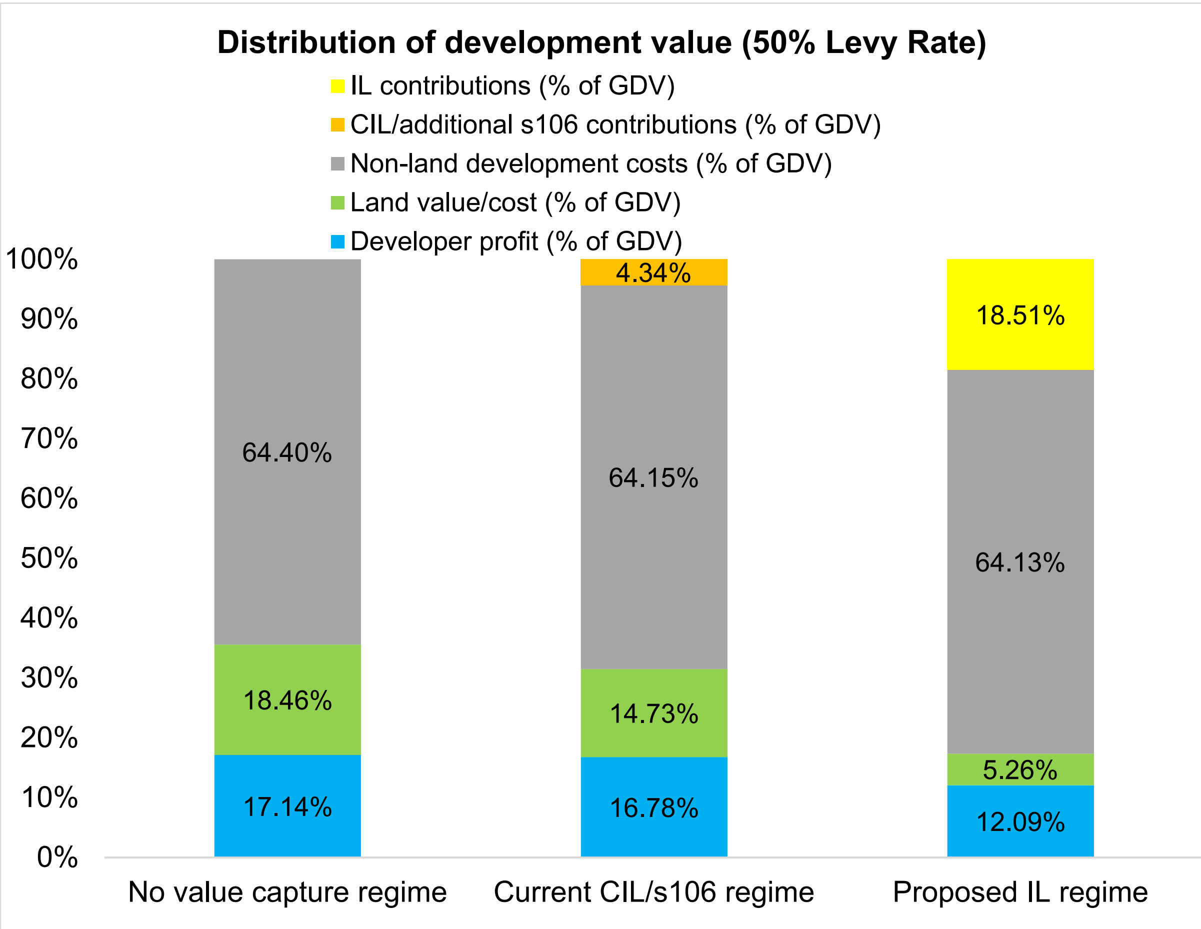
3.27 The implication of the modelling is that the potential to capture value from PD schemes of this nature is quite limited. Whilst conversion costs will be highly variable depending upon the specific development, they are often quite significant and, when combined with higher existing use values relative to greenfield developments, the minimum threshold is correspondingly relatively higher than it would be for greenfield residential development. For this reason, only very modest rates of IL would be viable – a rate of 9% in our modelled example.

3.28 The geography of PD activity is quite variable (Clifford et al., 2020) but it may be the case that IL, even at low rates, would only be viable in areas where development values are strongest.

Student accommodation

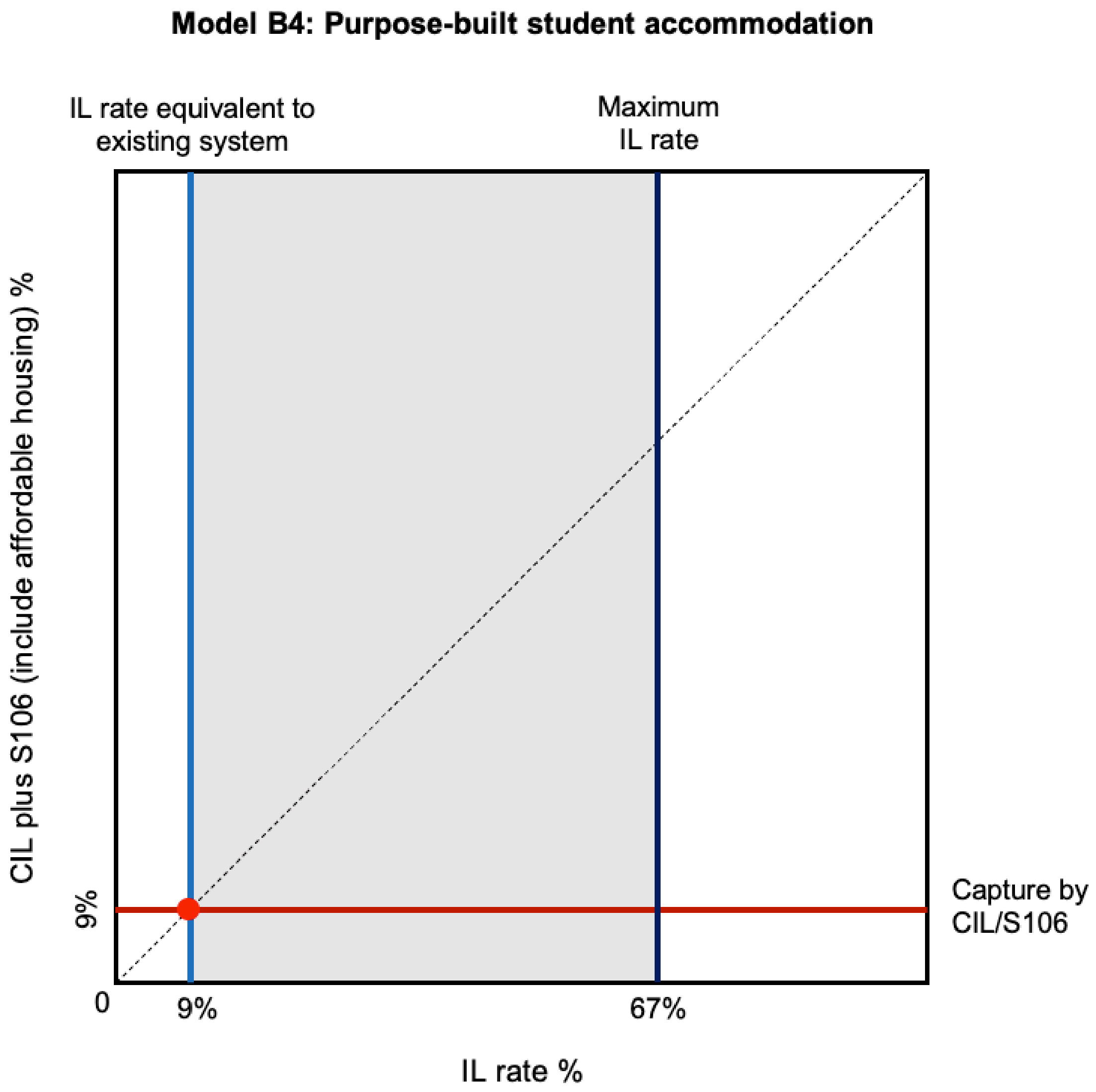
3.29 Model B4 provides an account of a purpose-built student accommodation development. These developments have been very popular over the past decade and have become a consistent feature of new development in many university towns and cities. However, the current system performs relatively poorly regarding capturing developer contributions from developments of this type. Figure 3.6 shows that only 4.34% of GDV would be exacted under a policy-compliant implementation of the existing system in the case of Model B4.

Figure 3.6: The distribution of GDV under the three scenarios for model B4



3.30 Figure 3.6 clearly illustrates the effects of developments of this type to be effectively largely exempted from developer contributions under the existing system. The lower bound (the level of contributions equivalent to the existing system) is just 9%. The estimated upper bound value that the IL could take, 67%, represents a window of 58 percentage points. Figure 3.7 illustrates the IL window for model B4.

Figure 3.7: The IL ‘window’ for model



Source: Authors’

3.31 The principal reason for the magnitude of the difference between the estimated lower and upper bounds indicated by Figure 3.7 above lies in the terms of the two systems being modelled. The existing system is biased towards affordable housing contributions exacted through S106. As student accommodation cannot include on-site affordable housing, much of the value capture occurs through CIL - assuming that the local authority is a CIL-charging authority (as Case Study B is). If the local authority in question was not a CIL charging authority it is conceivable that even less would have been secured through the existing system of exacting developer contributions.

3.32 Model B4 also serves to illustrate a potentially significant dilemma for local authorities when determining a rate, or several rates, that might be appropriate for IL to take on a geographically variable basis. Purpose built student accommodation of the type modelled as B4 is commonly found in dense, urban brownfield contexts: a rate that might be appropriate for this development type may be incompatible with very proximate development of other types. Stated alternatively, a rate that might be appropriate for model B4 would not necessarily be appropriate for the previously discussed model A4: the estimated maximum rate at which the IL could be set for A4 is 9%, the same as the estimated lower bound for B4.

Warehousing

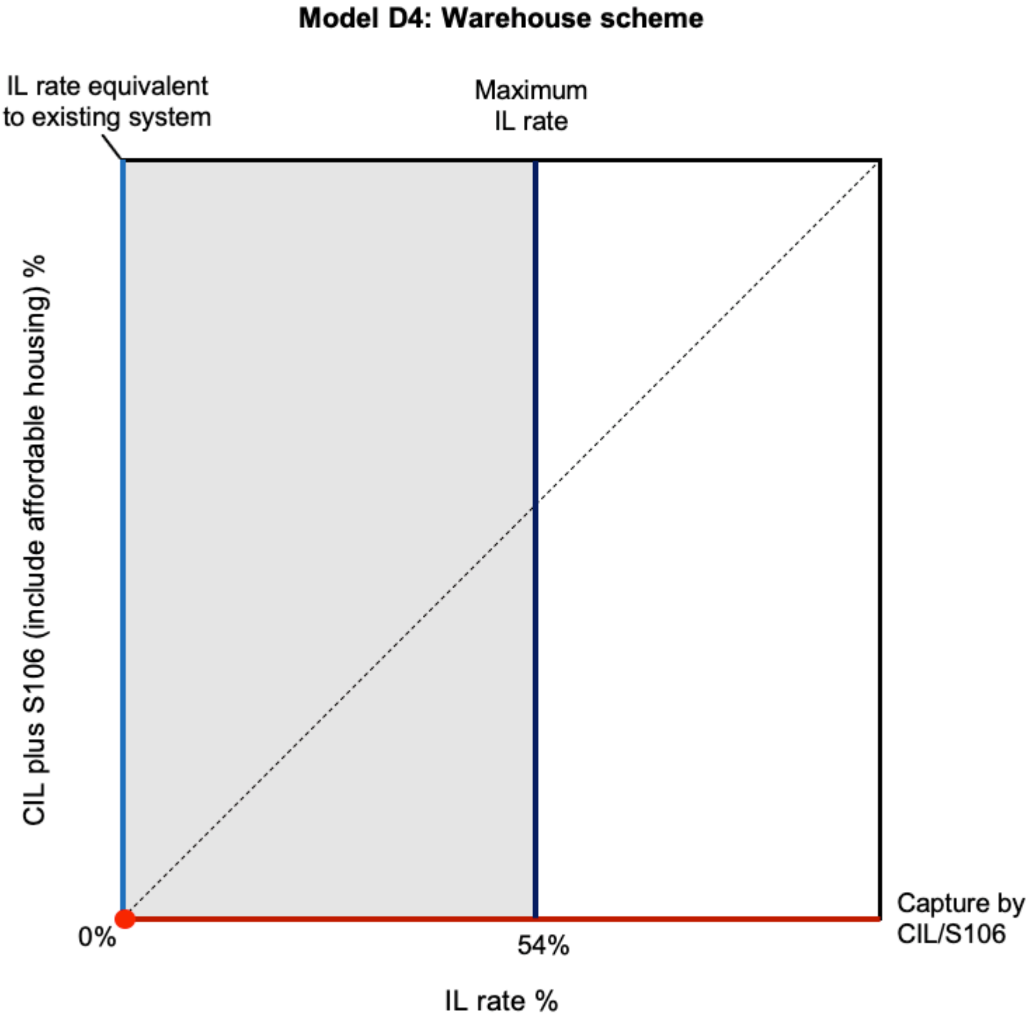
3.34 Another very popular development type over the past decade has been the emergence of large distribution and logistics facilities. As a non-residential use class these warehouses do not regularly attract developer contributions as they do not make affordable housing contributions and are often either explicitly exempted from CIL or located in lower value settings where CIL charging is comparatively low. The net result of these two observations is that, under the modelling assumptions, the existing system recovers no developer contributions in these models.

3.35 Case Studies D, E and F all include modelled outcomes for warehouse developments that show that the IL as modelled would be viable at rates up to 24% in two cases (E4 and F4) and up to 54% in D4. All three cases record a lower bound of 0% as this type of development is effectively outside the scope of the existing system by which developer contributions are collected. Figure 3.8 provides the IL window diagram for model D4 which serves as a good example of this type of development.

3.36 All three models of warehousing developments showed a wide range of possibilities that the IL might take in these contexts. As with the Permitted Development scheme modelled in A4 and discussed above the lower bound for the value the IL might take with warehousing is zero – the development type is effectively exempted from developer contributions under the existing system. The upper bound varies between 54%, as illustrated for model D4 in Figure 3.8, and 24% (models E4 and F4).

3.37 The above findings suggest that this important category of development may be more effectively covered by the IL than the existing system. The range of possible values that the IL could take is relatively wide and strongly dependent upon general real estate values: the principal explanation for the significantly higher upper bound in model D4 relative to E4 and F4 is the presence of stronger market values.

Figure 3.8: the IL window for model D4



Source: Authors'

The 'negative' window: Are policy compliant outcomes always achieved?

3.38 In four cases (B2, B3, D3 and F3) the range of values that the IL could take is negative: i.e., the upper bound (the maximum value at which the IL could be set) is below the lower bound (the IL rate equivalent to the policy-compliant, existing system). Table 3.2 illustrates the existence of the negative window and how it relates to the arbitrary, hypothetical modelled rate of a 50% IL.

3.39 The existence of a negative window in four cases is an anomaly. The implication of a negative window is that the estimated maximum levy rate that could be applied is lower than the scale of developer contributions that would be exacted under the locally policy-compliant implementation of the existing system. The most likely explanation for this anomalous outcome is that the scale of developer contributions that would be required under the terms of local policy could not be realistically achieved in practice.

Table 3.2: Key indicators for all twenty-four development models under the hypothetical modelled IL rate of 50%

			Value Capture % (existing system)			Value Capture % (IL @ 50%)		Land Value Change (% of GDV)			Profitability Change (% of GDV)		
		Viable at IL of 50%?	CIL + Non AH 106	Affordable Housing	Total	IL	IL - Existing system	Land Value (CIL/106)	Land Value (IL)	Land value change	Profit (CIL/106)	Profit (IL)	Profit change
Model A1	Greenfield Residential	Yes	5.98	14.78	20.76	32.21	11.45	31.59%	24.02%	-7.57%	11.94%	8.58%	-3.36%
Model A2	Brownfield Residential	Yes	6.19	16.8	22.99	29.83	6.84	12.90%	9.40%	-3.50%	12.85%	9.75%	-3.10%
Model A3	Brownfield Residential	Yes	7.14	16.8	23.94	26.73	2.79	6.75%	6.09%	-0.66%	11.00%	8.92%	-2.08%
Model A4	PD Office-to-residential*	No. Max rate = 9%	0	0	0	19.72	19.72	N/A	22.00%	N/A	N/A	16.58%	N/A
Model B1	Greenfield Residential	Yes	3.15	15.75	18.9	29.57	10.67	25.20%	17.92%	-7.28%	10.43%	7.53%	-2.90%
Model B2	Brownfield Residential**	No. Max rate = 31%	3.01	10.5	13.51	21.9	8.39	2.03%	-2.84%	-4.87%	11.05%	7.87%	-3.18%
Model B3	Brownfield Build-to-rent**	No. Max rate = 0%	2.98	10	12.98	22.16	9.18	-0.38%	-5.82%	-5.44%	15.72%	11.25%	-4.47%
Model B4	Purpose-build Student Accommodation	Yes	4.34	0	4.34	18.51	14.17	14.73%	5.26%	-9.47%	16.78%	12.09%	-4.69%
Model C1	Greenfield Residential	Yes	3.38	15	18.38	29.31	10.93	26.03%	18.75%	-7.28%	10.75%	7.59%	-3.16%
Model C2	Greenfield Residential	Yes	4.17	15	19.17	25.87	6.7	20.30%	17.25%	-3.05%	9.18%	6.92%	-2.26%
Model C3	Greenfield Residential	Yes	3.75	15	18.75	22.85	4.1	16.24%	13.88%	-2.36%	7.90%	6.33%	-1.57%
Model C4	Strategic Urban Extension	Yes	0	14.55	14.55	18.2	3.65	5.69%	4.44%	-1.25%	17.13%	14.81%	-2.32%
Model D1	Greenfield Residential	Yes	2.91	13.88	16.79	25.57	8.78	22.02%	15.90%	-6.12%	9.11%	6.87%	-2.24%
Model D2	Greenfield Residential	Yes	1.81	13.88	15.69	18.99	3.3	13.05%	11.68%	-1.37%	6.64%	5.59%	-1.05%
Model D3	Greenfield Residential**	No. Max rate = 49%	1.19	13.88	15.07	11.6	-3.47	2.73%	5.17%	2.44%	3.51%	4.09%	0.58%
Model D4	Warehouse Scheme	Yes	0	0	0	19.85	19.85	20.54%	6.97%	-13.57%	17.35%	11.99%	-5.36%
Model E1	Greenfield Residential	Yes	3.49	10.18	13.67	23.27	9.6	20.42%	14.11%	-6.31%	9.28%	6.42%	-2.86%
Model E2	Greenfield Residential	Yes	0.85	7.12	7.97	17.02	9.05	15.65%	9.98%	-5.67%	7.50%	5.19%	-2.31%
Model E3	Greenfield Residential	Yes	0.68	2.37	3.05	6.94	3.89	4.34%	1.68%	-2.66%	4.25%	3.21%	-1.04%
Model E4	Warehouse Scheme*	No. Max rate = 24%	0	0	0	13.98	13.98	11.35%	1.79%	-9.56%	15.51%	11.74%	-3.77%
Model F1	Greenfield Residential	Yes	2.93	5.97	8.9	23.27	14.37	24.07%	14.05%	-10.02%	10.07%	6.40%	-3.67%
Model F2	Greenfield Residential	Yes	2.34	6.45	8.79	17.02	8.23	14.98%	9.97%	-5.01%	7.38%	5.18%	-2.20%
Model F3	Greenfield Residential**	No. Max rate = 4%	0	5.96	5.96	6.94	0.98	2.42%	1.64%	-0.78%	3.46%	3.19%	-0.27%
Model F4	Warehouse Scheme*	No. Max rate = 24%	0	0	0	13.98	13.98	11.35%	1.79%	-9.56%	15.51%	11.74%	-3.77%

*These development types are unviable at the modelled nominal rate of 50%. In each case the effect of imposing an IL rate at this level would be to depress land values below BLV.

** These development types have a 'negative window' where the estimated upper bound is lower than the estimated lower bound.

3.40 Should local authorities deviate from policy compliant outcomes the effective value that would be recovered in practice under the existing system would be below the estimated lower bound. One way that developer contributions may be revised downwards in practice would be for the result of S106 negotiations to result in the provision of affordable housing at below policy-compliant levels.

3.41 It was not possible (or desirable) to model what might be achieved in practice in the hypothetical development models, precisely because they are hypothetical. What might be achieved in practice on a particular site can be highly variable, largely because the extant system allows for great variability. The negotiation process at the heart of S106 results in developer contributions that are heavily context dependent and determined on a case-by-case basis.

3.42 Furthermore, in circumstances where the scale of policy-compliant affordable housing is sacrificed to make a development proposal viable, the way this sacrifice takes place can be less apparent than real. For example, a commitment to provide a nominally greater proportion of First Homes or Shared ownership can be economically equivalent to a smaller share of intermediate rent and/or social rent. The precise mix of affordable housing products that are agreed between an LPA and a developer can vary, to settle on outcomes that make the development viable whilst providing a level of affordable housing that is politically acceptable in the given local context.

Changes to land values

3.43 The exaction of developer contributions generally results in lower land values. This can be seen in all the models by comparing the policy-free environment with the operation of the existing system – in all modelled examples the implementation of the existing system results in lower land values. However, in all but one of the 24 models, the introduction of the IL results in a greater proportion of land value capture than under the modelled existing system. In some models this effect was significant. For example, in the three models of warehouse development (D4, E4 and F4) one of the effects of the modelled IL was to exert downward pressure on land values as a proportion of GDV (13.57% for D4; 9.56% for both E4 and F4). It should be noted that these, the most extreme examples of the potential effect of IL on land values, are development types that are currently effectively outside the existing system.

3.44 In those greenfield areas where the IL window is widest and the arbitrarily modelled 50% IL rate is below the estimated upper bound value that the IL could take, there is a corresponding downward pressure on land values. For example, Models A1, B1 and C1 are all higher value greenfield residential developments and saw modelled land values depressed by -6.81%, -7.28% and -7.28% respectively.

3.45 Throughout this research we have employed the concept of Benchmark Land Value to provide an indicative measure of the return to the landowner that would be required to incentivise land release. This concept includes the commonly applied premium of 25% to existing use value in order to incentivise land release. However, the concept of BLV is significantly under-researched and there is no comprehensive evidence regarding the returns relative to existing use value that might be required to ensure land is released. Furthermore, it is also possible that there could be strong behavioural determinants of why a landowner may, or may not, choose to release land for development.

Changes to profitability

3.45 One of the cornerstones of the modelling approach taken is the assumption of a constant 15% internal rate of return to the developer under all three scenarios: the policy free environment, the existing system, and the proposed IL. A rate of profit as a fraction of gross development value is correspondingly implied under each scenario and reported in the table of model outputs for each development type in Appendix 1.

3.46 However, it should be noted that the commonly employed approach of measuring profitability relative to GDV is not a good indicator of profitability. The return to the developer should be understood relative to their investment which can, and does, alter within the models: the delivery of some schemes requires lower levels of investment under the IL than under the existing system. This concept is best captured by holding the IRR constant at 15% which effectively means the returns to the developer under each modelled scenario are fixed.

3.47 Phased developments of low density, residential projects on greenfield sites produces very different cash flows compared to a high density, single block development for the same number of dwellings. For phased, low-density projects, the cash flow can turn (and remain) positive after 9-12 months until the end of the project. For the latter, the project cash flow is often negative until practical completion. For single block developments the developer will have to invest more capital upfront and for longer; revenues and profits will occur further in the future than they would for greenfield development.

3.48 This point reinforces the value of evaluating schemes based on IRR. Assuming the same required profit margin as a proportion of GDV on each project would take no account of these important differences in the level of investment required and the timing of both investment and returns. If we assumed that a common profit margin defined as a percentage of GDV the results would fail to identify the timing advantages of phased, low-density developments compared to ‘single block’ projects.

3.49 If (very) notional interest payments were also considered a lot of potential abnormal returns would be effectively allowed for in low density, greenfield schemes.

3.50 For example, in Model F2 for the median house price location an IRR p.a. of 15% and a Return on Capital Employed of c. 26% equates to a profit margin on GDV of 5.54% under the modelled example of an IL rate of 50%. To deliver a profit margin equivalent to (hypothetically) 15% of GDV, the IRR would need to be 86% and the Return on Capital Employed would need to be 129%. If notional interest costs have also to be returned, the IRR and Return on Capital Employed would need to be even higher. It would be reasonable to argue that such a rate of return would be extreme given the prevailing returns in other areas of business activity. However, this is precisely what would have been implied had a notional 15% of GDV as profit requirement been the modelling principle employed in the context of such low density, phased development projects.

3.51 In the same way that using profit as a fraction of GDV can lead to implausible performance metrics for projects that deliver the positive cash flows close to the beginning of a development project, the opposite effect can occur when the projects are 'back-loaded' towards the end of a long-term project. This effect is particularly evident in Model C4, the Strategic Urban Extension. In this case, 15% IRR per annum produced a land value estimate that was equivalent to a profit margin on GDV of 17.33%. Therefore, the IRR p.a. would be just over 11% if the land was purchased with a target profit margin of 15% of GDV.

The importance of development values and their variability

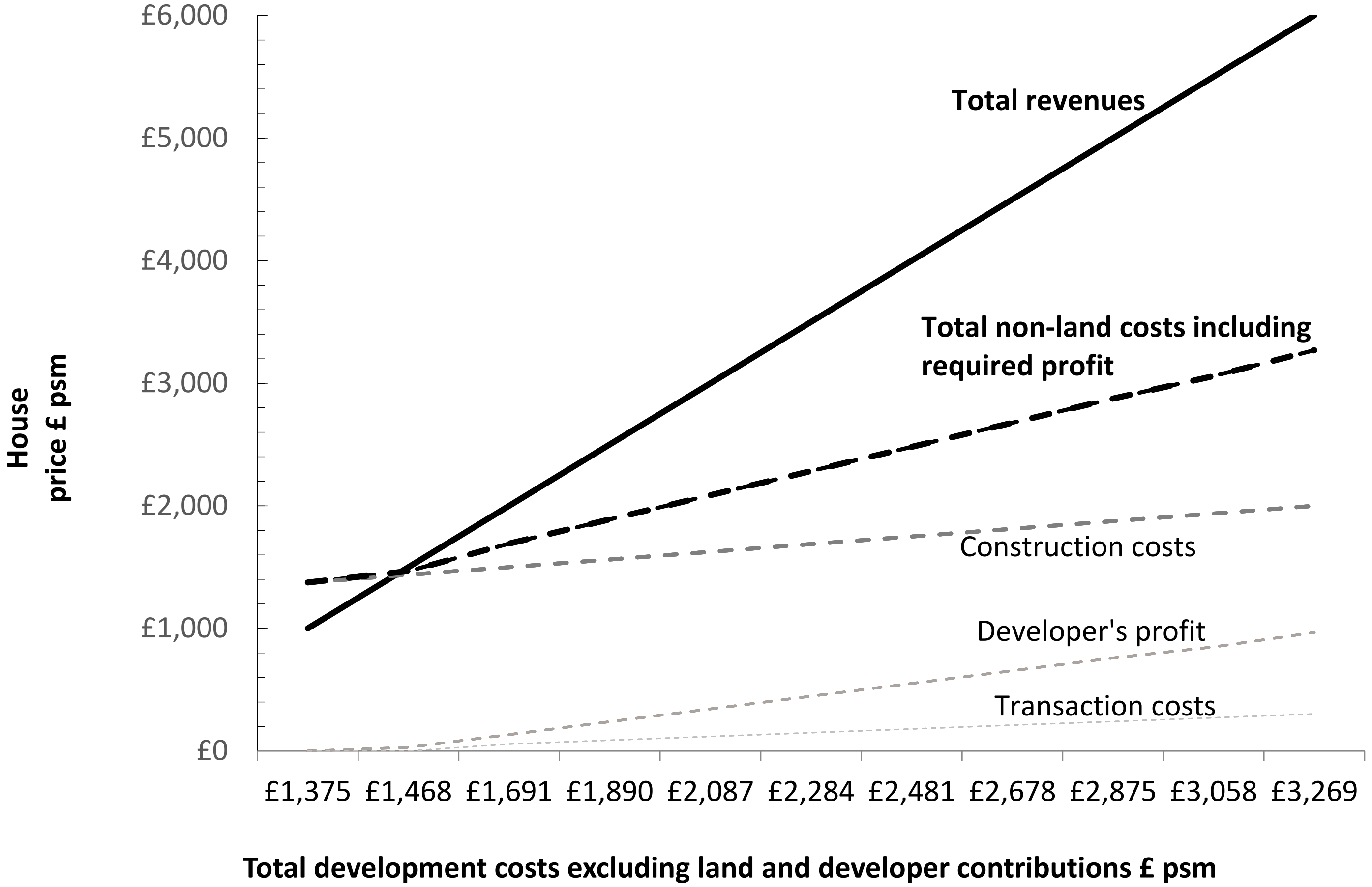
3.52 Building upon the premise that development land values are mainly a function of the difference between real estate capital values and non-land development costs, geographical variations in these variables will produce variations in development land values. For instance, in locations with relatively low house prices, residential development land for low density developments can sell for £300,000-£400,000/ha. In areas with relatively higher house prices an equivalent site can command as much at £3-£4 million/ha. In some inner London boroughs, residential development land for high density schemes has commonly sold in the range £30-£40 million/ha.

3.53 Other real estate sectors show similar variation. For instance, the latest VOA data estimates industrial land values of £135,000/ha in Northumberland compared to £6 million/ha in Brent. For residential land VOA estimates suggest much higher variation, for example, £370,000/ha in Burnley, £7.16 million/ha in Brighton. These examples are cited for illustrative purposes only and may or may not correspond to the case studies upon which the modelling work reported in this document is based. This variation in land values is largely due to the variation in the prices of housing and industrial space rather than variation in the non-land development costs. Base build costs for a three-bedroom, 100 m² dwelling in the North East are approximately £120,000. In the South-East, base build costs are closer to £150,000 for an equivalent dwelling. However, median selling prices in the South East are far more than those recorded in the North East. It is these variations in cost-value price ratios that produce the observed differences in the prices that residential developers are prepared to pay for similar residential development land in different markets.

3.54 To illustrate the relevance of this point to the broader analysis we can model a five-hectare greenfield residential development with planning permission for 3,000 m²/ha of net developable area.

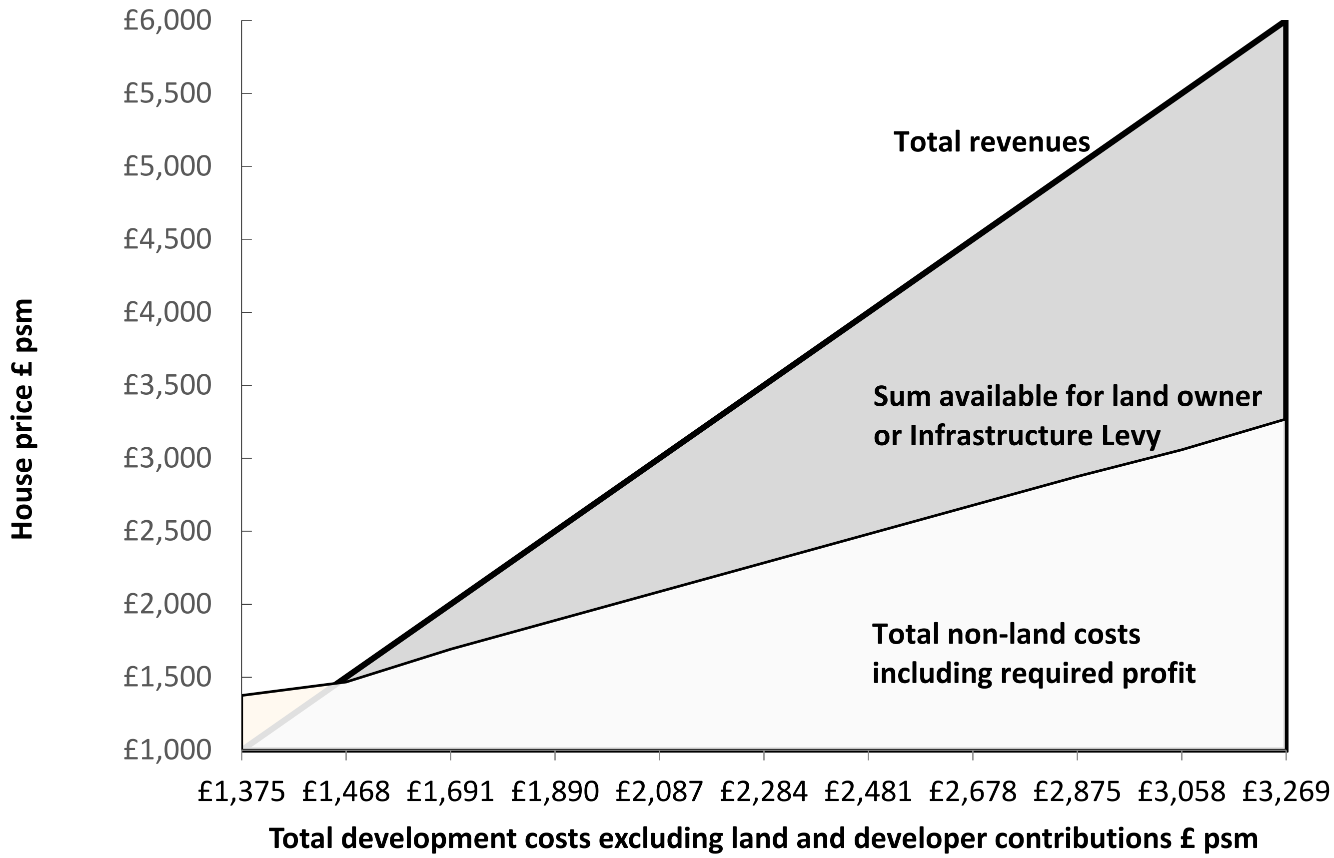
3.55 Figures 3.9 and 3.10 illustrate how the relationship between residential values and non-development costs produces varying surpluses that can be captured by the landowner and/or the local planning authority. The construction costs are based on BCIS data for different (house price) locations with estimated costs of site preparation, external works, professional fees and contingency added. Table 3.3 provides a sensitivity analysis to show how estimated land value varies for different estimates of construction costs and residential sale prices.

Figure 3.9 House prices, development costs and land value capture (greenfield**)**



Source: Authors'

Figure 3.10 Alternative indication of house prices, development costs and land value capture



Source: Authors'

Table 3.3 Bivariate sensitivity table: the impact on land value estimates (£/ha GDA)

Bivariate Sensitivity Table: Impact on land value (£/ha GDA)

		New Build Residential Prices (£ /m²)						
Base build costs (£ /m²)		**£1,500**	**£2,000**	**£2,500**	**£3,000**	**£4,000**	**£5,000**	**£6,000**
	£1,100	£7,201	£619,798	£1,246,798	£1,873,797	£3,127,796	£4,381,794	£5,635,793
	£1,200	£178,855	£448,144	£1,075,143	£1,702,143	£2,956,141	£4,210,140	£5,464,139
	£1,300	£350,510	£276,489	£903,489	£1,530,488	£2,784,487	£4,038,485	£5,292,484
	£1,400	£522,164	£104,835	£731,834	£1,358,834	£2,612,832	£3,866,831	£5,120,830
	£1,500	£693,819	£66,820	£560,180	£1,187,179	£2,441,178	£3,695,177	£4,949,175
	£1,600	£865,473	£238,474	£388,525	£1,015,525	£2,269,523	£3,523,522	£4,777,521
	£1,700	£1,037,128	£410,128	£216,871	£843,870	£2,097,869	£3,351,868	£4,605,866
	£1,800	£1,208,782	£581,783	£45,216	£672,216	£1,926,214	£3,180,213	£4,434,212

Source: Authors’

3.56 As expected, whilst there is a positive relationship between house prices and base build costs, the difference between values and costs exhibits a divergent trend because, for a given increase in house prices over space, build costs tend to increase much less - although it is recognised that tall buildings do have significantly higher build costs. Whilst none of the local authorities specified sites with tall buildings, it may be appropriate for local authorities to adjust minimum thresholds in areas that have been identified as suitable for high density development to reflect the impact of density on build costs.

3.57 The variation in a developer's required return is closely and positively related to changes in houses prices. In areas with high house prices, developers usually need to invest more in land and construction costs and, in turn, need to receive a greater return as profit to obtain the same internal rate of return. Evidently, some transaction costs and fees are linked, due to ad valorem relationships in the prices of housing and land e.g., Stamp Duty Land Tax is c. 5% of the price paid for development land. In this example, in the absence of any developer contributions, it is estimated that approximately £1,635/m² is the residential price point where the residential land value equals the agricultural land value of £20,000/ha. At prices above this level the surplus available for either developer contributions or increased payments to the landowner increases.

3.58 In Figure 4.2, the grey area illustrates the amount that is available for each m² sold for land payments and developer contributions. At residential sales values of £5,000/m², an estimated £2,125/m² of residential space equivalent to £212,500 per dwelling (of 100 m² in size) or £6.375 million/ha is available for land and developer contributions. In a location where residential sales values are 40% lower at £3,000/m², land values are around 57% lower. In the latter case an estimated £913/m² of residential space equivalent to £91,300 per dwelling per (of 100 m² in size) or £2.74 million/ha is estimated to be available for land acquisition and developer contributions. For greenfield residential developments with similar densities of development the level of house prices is the main determinant of the land value and consequently the potential for land value capture.

3.59 Whilst land value is a function of the expected revenues and costs associated with a development project, brownfield sites are also likely to vary in terms of density. A high-density development can have anything from 150 to more than 750 dwellings per hectare. If the additional costs per unit do not exceed additional revenues per unit, increasing density will result in higher land values. In terms of viability modelling this effect of absolute increases in land value will mean that higher density schemes are more likely to exceed a given Benchmark Land Value.

Conclusions: Looking through the 'window'

3.60 The analysis contained in this chapter points to the potential for the IL to provide local authorities with a potentially flexible tool to manage developer contributions that may be better suited to some conditions than others.

3.61 The aggregate of findings presented in this chapter illustrates that the IL is best suited to uncomplicated greenfield sites in higher value settings. The width of the IL 'window' in these contexts would theoretically provide local authorities with considerable flexibility to achieve developer contributions at, or potentially even above, the levels that would be entailed under a policy-compliant implementation of the existing system.

3.62 The IL would also potentially bring developments into scope for developer contributions policies that have previously been effectively outside the existing system. Good examples of this type of development can be found in purpose-build student accommodation (model B4) and warehousing (models D4, E4 and F4).

3.63 However, in other contexts, particularly brownfield developments, the IL window narrows offering local authorities far less flexibility in the identification of a rate that would maintain development viability.

3.64 By way of conclusion, it should be noted that the estimated lower and upper bounds that define the IL window are estimates predicated on some important assumptions.

3.65 First, the lower bound's synchronisation with a policy-compliant version of the existing system is an idealised version of the results of S106 and CIL in operation: some local authorities may routinely not achieve policy compliant outcomes. In instances where local authorities are in practice currently achieving lower levels of developer contribution than modelled, understanding the rationale and context for this practice will be crucial to understanding the true lower bound that the IL might take.

3.66 Second, the upper bound provides an estimate of the maximum value the IL could take whilst preserving development viability and the Benchmark Land Value. However, there is very little research on the degree to which BLV represents an adequate incentive for landowners to release land for development: should BLV be an underestimate the upper bound for the IL would correspondingly be lower.

3.67 In practice it would be at the discretion of local authorities to determine rates for IL that they assess to be appropriate across the local authority area. In the next chapter we report on qualitative engagements with the six case study local authorities regarding the specific challenges that implementing the IL might entail.

Chapter 4: Investigating the process by which LPAs might implement the Infrastructure Levy

Key findings

- This chapter presents an account of qualitative research conducted with the six local authority case studies to explore the range of challenges that the replacement of the existing system with the IL might entail. Six specific areas are discussed:
- *CIL versus non-CIL charging authorities.* There may be a sensible distinction to make between CIL and non-CIL charging authorities regarding local authorities' readiness to implement the IL proposal. In CIL charging authorities viability studies have generally been commissioned to establish the initial case for CIL and define (and in some cases redefine) its subsequent operation. The mandatory introduction of IL would necessitate a similar process of evidence gathering for non-CIL charging authorities.
- *Data requirements in setting the IL rate and the minimum threshold.* Local authorities expressed the view that the IL would require the collection of new data and a very clear direction regarding some of the parameters that would be essential to the determination of IL rates and minimum thresholds.
- *How might the IL be used to govern development outcomes?* Some interviewees raised the prospect that the IL has the potential to be used in some contexts as an instrument of development control: pro-development local authorities may set rates 'low' to stimulate development activity whilst others may opt for higher rates to discourage new development.
- *Affordable housing.* All local authorities expressed enthusiasm for the principle of providing an equivalent or greater scale of affordable housing to the existing system. However, some interviewees questioned the degree to which the IL would diminish negotiation as the blend of affordable housing products that a local authority might wish to see delivered may vary site-by-site.
- *Collecting the levy.* Some interviewees identified potential risks to their local authority that might accompany the introduction of the IL. If the value of the development decreases, then there is potential for a decrease in the IL receipts. This may be problematic where local infrastructure is perceived to be needed by the local community. In these instances, the local authority may not be able to fund the infrastructure that a community expects.
- *Spending the levy: severing the connection with the site of development?* Some local authorities argued that the proposed IL represented a conceptual shift in how developer contributions policies are implemented that is potentially in tension with the terms of the broader discretionary planning system.
- S106 agreements entail a clear connection between the site of development and the return of developer contributions to that site. Fundamentally, the S106 system is a cost-based mitigation method that primarily seeks to make development contextually acceptable. The IL would potentially represent the severing of the connection between exacting developer contributions and the return of that investment to the site of development.

Introduction

4.1 A core goal of this research was to work closely with six individual local planning authorities to establish the process by which an Infrastructure Levy charging schedule might be determined.

4.2 We engaged with the six case study local authorities over the twelve-week period 16th August – 5th November 2021. Each local authority had a designated contact from the project team who managed all aspects of communication between the local authority in question and the wider project team. Following an initial inception meeting, the local authorities and project team worked constructively to co-produce four hypothetical development models and explore the potential implications of the introduction of the IL in the relevant local authority context.

4.3 At the inception meeting a Technical Specification Document drafted by DLUHC on the underlying principles and potential operation of the IL was shared with local authorities. This document formed the basis for our engagement with the local authorities and represented the starting point for the construction of development models.

4.4 In the following analysis we report on six areas where our experience of working with the local authorities to produce the modelled outcomes set out in Chapter 3 would suggest there are relevant questions for how the IL may be designed and implemented.

CIL versus non-CIL charging authorities

4.5 Evidence from our engagement with the six case study authorities would point to variation in the readiness of CIL and non-CIL charging authorities to engage with the IL proposal.

4.6 Amongst authorities that have adopted CIL, there is now a fairly well-established locally bespoke literature in the form of commissioned viability studies that provide comprehensive accounts of the local development context. In most cases the process of adopting CIL has been accompanied by extensive studies designed to mirror the assessment of development viability common in private practice. However, in some LPAs that have not adopted CIL there is not the same level of institutional experience with collecting data on the wide range of development types and the geography of development values. The scale of this disparity between CIL and non-CIL charging authorities should not be underestimated. At the time of writing a total of 52% of local authorities charge CIL. However, as Table 4.1 illustrates the geography of CIL adoption is variable. For example, 73% of local authorities in the South West have adopted CIL whereas only 21% of authorities in the North West and 25% in the North East are CIL-charging authorities.

Table 4.1: CIL charging authorities by English regions

Region	Total number of LPAs	Number of CIL charging LPA	% of CIL charging LPA
East Midlands	35	10	29%
East of England	45	18	40%
London	33	32	97%
North East	12	3	25%
North West	39	8	21%
South East	64	43	67%
South West	30	22	73%
West Midlands	30	14	47%
Yorkshire and The Humber	21	10	48%
Total	309	160	52%

4.7 The continuities between CIL and IL (designating charging zones and setting a levy rate between which does not hinder development viability) mean that in authorities where CIL has not already been adopted a great deal of evidence gathering will be required to set geographically variable IL rates. As one authority noted:

"Rather than simplifying the process the proposed changes are likely to make the system more complicated and give less certainty to both the public and Local Authorities about what will be delivered and when, particularly in relation to affordable housing." (Case study interviewee B1)

4.8 Even in CIL charging authorities the continuity between CIL and IL will not necessarily mean that the existing studies conducted to support the implementation of CIL will be sufficient to inform the implementation of the IL. All local authorities that have adopted CIL have done so within the context of S106 being the dominant means of exacting developer contributions of several decades standing. This means that CIL has been understood as a complementary measure that has been set at rates that work in concert with the pre-existing S106 system. This has had at least two effects on the operation of CIL.

4.9 Firstly, CIL and S106 interact. Research by the Authors' (Lord, Cheang and Dunning, 2021) shows that in local authorities that have adopted CIL the existence of the levy can have a significant effect on the scale and character of what is exacted.

4.10 Secondly, CIL is conceived, in common with S106, as a cost-based measure. That is, like the S106 system with which it has been integrated, CIL has been designed and implemented by local authorities to act as a transparent *cost* that the development industry can conceptually incorporate into the broader costs of development (construction costs, labour, professional fees etc.). In those local authorities that have adopted CIL it consequently acts as a supplementary cost-based measure in tandem with S106 to (ideally) recover more of the uplift in land values resulting from the award of planning consent than might have previously been attained solely under S106.

4.11 However, for these two reasons there are some significant impediments and inefficiencies in the system.

4.12 Some local authorities may set a single rate for CIL that is not reflective of the variety of development contexts in the area. This may be the result of uncertainty regarding what the combined effects of CIL and S106 might do to development viability - modelling the combined effects of CIL and S106 operating in parallel is a statistical challenge. For non-CIL charging authorities this has been the central question underpinning their reluctance to adopt CIL. For authorities in lower value areas the fear has historically been that the effect of CIL may be to compromise development viability and/or 'crowd out' the local authority's capacity to negotiate S106 contributions rather than acting as a way of exacting more value, as it may do in higher value settings. Research by the Authors' (Lord, Cheang and Dunning, 2021) would suggest that the current rate of CIL adoption may represent a saturation point.

4.13 The proposed wholesale replacement of a cost-based approach to developer contributions, through the combined effects of S106 and CIL working in tandem, with an Infrastructure Levy based on sales values represents a fundamental systemic shift that will require a significant adaptation by all LPAs, even if they are already CIL charging authorities.

Data requirements in setting the IL rate and the minimum threshold

4.14 In order to produce the models reported in Chapter 3 the research team had to collate a large amount of specific data from a variety of sources.

4.15 For non-residential development types a range of sources were used to evaluate realistic market values. Some of this data came through scrutiny of existing viability assessments that have been undertaken within the local authorities in question, particularly those that had commissioned such documents to support the introduction and/or revision of CIL rates.

4.16 Data of these types is essential to the process of establishing a rate for the IL. In the absence of a clearly specified IL rate, we chose to model an arbitrary rate of 50%. However, the modelling work presented in Chapter 3 allows for the identification of a 'ceiling' – the maximum levy rate that would be possible whilst maintaining development viability – and an equivalent rate to the scale of implied developer contributions that would be recovered under the policy-compliant operation of the existing system.

4.17 The variability of market conditions contained in all 6 local planning authorities would mean that each authority would likely choose to institute different rates in different areas – as is commonly done with CIL. However, this entails two issues.

4.18 Firstly, the rate at which the IL is set in different locations will be both the outcome of the quantitative analysis such as that contained in Chapter 3 and a qualitative judgement that will reflect local authorities' attitudes to development.

4.19 Secondly, the determination of the geography of differential rates will entail a local political process. The experiences of CIL-charging authorities would suggest that most authorities have chosen to implement a small number of charging zones with different effective rates of CIL – usually no more than 3. However, as noted earlier in this chapter this is reflective of CIL operating in tandem with S106 as the dominant mechanism for the exaction of developer contributions. Our modelling used lower super output areas to produce a clear portrait of the degree of variability in real estate values across a local authority. It is conceivable that LPAs would need to set several different levy rates applicable to different areas within their boundaries.

4.20 Whilst setting multiple zones is currently the case with CIL and would continue under IL.

"Setting a simple national IL rate would be very helpful from a procedural perspective, it would mean we are not arguing locally about what the rate should be, knowing that we're charging the same as other authorities." (Case study interviewee C1)

"Levy rates being set by local authorities means LPAs are continuing to deal with the problem of viability arguments. One of the benefits of a standard levy is discussion and argument about viability can be avoided. The lengthy consultation and examination process of CIL remains in IL, leading to more work for LAs and more uncertainty over viability. It is essential there will be guidance on the evidence required and methodology. Otherwise, it is hard to see what the difference is between IL and CIL." (Case study interviewee E1)

4.21 These quotes highlight one of the key tensions within all systems of land value capture, that of locally bespoke charges and national rates. A locally determined charge enables a highly contextually specific approach, which can factor in local politics, housing market activity and the specific site and development characteristics but is a complex and time-consuming activity. A nationally determined rate avoids these issues but introduces a level of inflexibility which will mean that some developments either do not provide the land value capture which would be possible or make the development unviable. This tension existed in S106 prior to the introduction of CIL, is present under the current system and will continue under the IL as currently described.

The minimum threshold

4.22 Determining the minimum threshold turns on the establishment of existing use value, base build costs and the full range of costs attendant to development, such as professional fees. Data for this part of the modelling process comes from the BCIS database and relevant local secondary sources on existing use values.

4.23 One of the challenges that LPAs will have to confront in implementing the proposed IL is adjusting the minimum threshold by development type at sufficient frequency to capture changes in the costs of development. However, this challenge is also one of the strengths of the proposed IL and a core distinction between the IL as proposed as CIL: the IL proposal would provide LPAs with the opportunity to revise the minimum threshold annually to reflect changes in the development industry, for example, inflation in materials.

4.24 Two LPAs raised questions about how the IL threshold might be calculated and whether there would be a common national calculation to determine the threshold. This nationally prescribed calculation was considered both potentially useful and potentially problematic. First, they described the significant challenges they have had with setting CIL charging zones and the degree of evidence and scrutiny required to introduce the charge. Should the IL threshold be set locally, then there was concern that the process of setting the threshold could require a similarly complex process, with the potential for disagreement between developers and LPAs at the stage of setting the threshold. A threshold calculation that was prescribed nationally was considered to reduce this burden of evidence gathering for LPAs. Second, and in contrast to this strength of a nationally applied threshold method, some LPAs expressed concern that local circumstances may not be appropriately incorporated into the decision regarding the minimum threshold. These concerns related to methodological queries regarding very specific local circumstances (e.g., particular remediation costs) and local political pressure to encourage or discourage development in particular places predicated on lower or higher threshold values than would be produced by a nationally applicable calculation.

How might the IL be used to govern development outcomes?

4.25 As noted above, the determination of the specific range of levy rates and their geography will have a local political context. Some local authorities reported anxieties that the IL could become a proxy for inter-authority competition. It is conceivable that pro-development authorities could use modelling work such as that reported in Chapter 3 to establish levy rates that are ‘low’ and encourage greater development in their area – possibly encouraging migration from one LPA area to another. Similarly, in other local authorities where there are local concerns about over-development the IL could be used defensively to set rates that could deter development

4.26 Previous research (Lord et al., 2018, 2020) has suggested that developers are more ready to migrate from one LPA to another in weaker markets where their market power is potentially greater. However, further research on this would be necessary to fully explore the inter-LPA effects of variable rates.

Affordable housing

4.27 The case study authorities agreed that prioritising affordable housing as a proportion of the overall levy rate could make a significant contribution to overall affordable housing provision. Delivering this as on-site provision, was also considered to be a compelling default position for IL.

"On site affordable housing provision is of upmost importance in delivering for our acute affordable housing needs. Any new approach for securing affordable housing must demonstrate the new process enables at a minimum parity with the current S106 route and continues to enable Local Authorities to secure the affordable mix of need which the current system provides." (Case study interviewee A1)

4.28 The potential for delivering more affordable housing was particularly noticeable on sites that would not have previously had an S106 for affordable housing negotiated. This will be particularly relevant if the IL applies to small-scale sites of fewer than ten dwellings.

4.29 One concern with the affordable housing component of IL was that negotiation regarding tenure and dwelling type to comprise the overall value would mean that negotiation between the LPA and developer would continue to be a part of affordable housing delivery through IL.

"I'm not sure how it would reduce the element of negotiation - we would still need to negotiate the type and tenure of the affordable dwellings as we do now. Of the total Infrastructure Levy would we be limited in the percentage that can be claimed for affordable housing? Potentially this could actually make it more time consuming as we would need to try and fit the need into a budget. It's likely there would still be the same negotiation with developers e.g. they may prefer to deliver majority 2 and 3 beds units as these will have a higher value attached to them without being too 'land hungry' thereby potentially reducing the number of units they need to deliver on site rather than 1 beds which would be worth less." (Case study interviewee C2)

4.30 Whilst some LPAs were concerned about the potential for negotiation to continue as a core component of agreeing developer contributions, a counter concern was also raised that requiring a certain value of affordable housing to be delivered on site may not always produce optimal results for the local authority.

"Not all sites are the same and the blanket approach may not be the best approach. Each site should be assessed on its own merits. With affordable housing, it is not a 'one size fits all' and the concept of the Infrastructure Levy would appear to be taking affordable housing the route of the 'one size fits all' approach" (Case study interviewee B1)

4.31 Overall, there was widespread enthusiasm for IL if it can be shown to deliver greater value of affordable housing on site, however, there remained queries regarding the ability of LPAs to negotiate how this would be delivered and some concern that the type of housing delivered may be engineered by developers to provide higher value but less useful for the local authority to meet local affordable housing need.

Collecting the levy

4.32 IL is intended to operate in a similar fashion to CIL, as a local land charge, however, it will be collected in a different way. CIL is set at the point of granting planning permission, but IL is liable on the final value of the development. This results in several difference permutations for collecting the levy than under the current system.

4.33 First, there is upside risk for the local authority. If the value of the development increases, for example through an increase in prices across the housing market, then there is the potential for an increase in the IL receipts. This potential was widely welcomed by LPA representatives. One LPA noted that a mechanism may be needed to ensure that developers notify the LPA should there be any increase in GDV.

"We agree with this in principle – but who will monitor the final value of the development? No incentive/mechanism currently for the developer to submit values to the council if higher than anticipated." (Case study interviewee C1)

4.34 Second, there is downside risk for the local authority. If the value of the development decreases, then there is the potential for a decrease in the IL receipts. This may be particularly problematic where local infrastructure is perceived to be needed by the local community. In these instances, the local authority may not be able to fund the infrastructure which a community expects to be delivered because of planning permission being granted.

"This will make it difficult for LAs to properly plan delivery of infrastructure etc as there will be no certainty as to the amount of money that comes in." ((Case study interviewee F1)

4.35 Third, as there is the potential for significant changes in the value of potential IL between the indicative levy liability undertaken at the point of planning permission and the final valuation of the development, there was concern amongst LPA representatives about how this might be monitored and evaluated. One issue was that the LPA would have to undertake ongoing analysis about whether it was in the public interest to ask for a re-valuation of the development, which would require resourcing on behalf of the LPA.

"Would the authority have to review two/three sets of viability assumptions? One to inform the indicative levy then another when inevitably the build costs and other inputs vary between approval and occupation? The third and final levy might be so far removed from the indicative one that this does not improve transparency or give confidence to the community as to how much has been secured." (Case study interviewee B1)

"Local authorities will be effectively calculating the levy at least 4 times – application, pre-commencement, pre-completion and post-completion. Whilst we agree that feeding in the levy liability as early as possible in the process is a positive move to give developers certainty and avoid viability issues, calculating the levy liability across multiple stages of a development is a significant amount of work and resource burden, particularly given the number of applications (which could be liable to IL) that we process and determine." (Case study interviewee E1)

4.36 A further concern was that the potential down-side risk of lower IL receipts than anticipated could make financial planning for infrastructure investments very difficult. This mirrored concern that the final development timing may be highly variable and therefore represent a more uncertain cash flow for local authorities than CIL currently does.

"Local authorities wouldn't know when to expect to receive payments, making forward planning for spending very difficult." (Case study interviewee C2)

"Allowing a developer to pay their IL any time between commencement of development and completion could potentially span a number of years with multiple opportunities for adjustments during this time, this would make it difficult for local authorities to calculate and forecast when funds will be received with certainty. (Case study interviewee B1)

Spending the levy: Severing the connection with the site of development?

4.37 Finally, some local authorities argued that the proposed IL represented a conceptual shift in how developer contributions policies are implemented that is in tension with the terms of the broader discretionary planning system.

4.38 Amongst those local authorities that have not adopted CIL the sole use of section 106 agreements entails a clear connection between the site of development and the return of developer contributions to that site. Fundamentally the S106 system is a cost-based mitigation method that primarily seeks to make development contextually acceptable. Moreover, the use of negotiated S106 has a conceptual integrity with the terms of discretionary planning system where all applications for planning consent are understood as unique and evaluated individually.

> "Being able to collect IL on smaller sites would be beneficial. It would mean that we receive contributions on a more regular basis [as there are many more small site developments than larger], which could help us to deliver infrastructure. But I'm concerned about the delivery of infrastructure that is needed before the developer can unlock larger sites." (Case study interviewee D1)

> "When borrowing against future receipts, there should be a mechanism within the S106 to allow monies to be clawed back from the developer should their development not go ahead. MK Tariff was an example of this where developers had a 'backstop date' after which payments were due whether they had built or not. This then shares the risk with the developer rather than placing all of the risk with the local authority, provides an incentive for the developer to deliver and for the local authority to deliver infrastructure earlier. This should not only apply to large and complex sites." (Case study interviewee C1)

4.39 By contrast with the existing system the IL, like CIL, would raise revenue. However, a common criticism of CIL is that it has been successful at raising revenues that local authorities have subsequently aggregated and not spent (Property Week, 2021). Of course, this may be part of an overall strategy within local authorities to deploy several years of CIL receipts at a future time in the delivery of major infrastructure projects. Nevertheless, the potential remains for periods of time to elapse between the completion of a development and the subsequent investment of IL proceeds generated by that development.

Chapter 5: Conclusions

Key findings

- In this final chapter we identify 6 areas that represent important conclusions from the research undertaken.
- *The IL represents a fundamental shift in the process by which developer contributions would be sought and managed.* The IL would be conceptually distinct from the existing system. The transition from a cost-based measure to a levy related to total sales income would represent a fundamental shift in policy with respect to developer contributions. This shift could entail a range of potential outcomes.
- *What might be the effects of changing the system by which developer contributions are secured?* There are a range of potential implications of the potential introduction of the IL. For example, it may bring some developments into scope for developer contributions that have been effectively outside the terms of the existing system. There will also be significant new challenges for local authorities in making decisions about the levy including rates, thresholds and the location of large sites for the S106 routeway and taking these decisions through their local plan process.
- *How much funding might changing the system raise?* There is potential to raise more but whether this can be realised compared with the existing S106 and CIL system depends not just on rates and thresholds chosen but on the extent of exemptions, how market participants react especially landowners, land promoters and developers, and the extent to which local authority borrowing costs in advance of receiving levy income reduces what is available to spend.
- *Are LPAs ready for the IL?* There is likely to be variability between local authorities with regard to their readiness to implement the IL. CIL-charging local authorities may be in a stronger position to engage with the IL proposal than non-CIL charging authorities. However, it is likely that all local authorities will need clear guidance on the process by which IL rates and minimum thresholds should be defined prior to undertaking specific research to support the local implementation of the IL.
- *Further questions for decision makers.* It will be important for decision makers to reflect carefully on the potential impacts of the IL on the development industry. For example, it is probable that the IL may prompt developers to reconsider both where and what they develop in response to the landscape of IL rates.
- The scale of reform implied by the replacement of the existing system with the proposed IL is likely to take considerable time to implement. A range of possible scenarios are easily imagined over such a transition period: some developers may rush to get applications in before the introduction of the new, unknown, system; other developers may choose to expand their output once the rules are determined; still others may wait in the hope that the new system is itself subsequently modified.
- Locally raised and spent IL will result in the highest value sites returning the greatest value of developer contributions. It is, therefore, possible that a shift to the IL would increase the geographic inequalities already evident in the current system. A process of testing, trialling and real-world learning could be helpful in establishing the effects of the IL.

Introduction

5.1 The findings presented in the previous chapters lead to several conclusions. In this final chapter we seek to synthesise these conclusions in order to provide an account of the opportunities and challenges associated with a potential shift from the existing S106/CIL system to the proposed Infrastructure Levy. We do this under six main headings.

A conceptual shift in the process by which developer contributions are managed

5.2 The proposed transition to the IL represents a conceptual shift in how developer contributions are exacted in England. Both the existing system and the proposed IL are predicated on the increase in land values resulting from the award of planning consent (and, in the case of IL, the exercise of PD rights). However, the existing system is cost-based and directed to the fundamental criteria of making development acceptable in planning terms and contributing to local community needs. It is, therefore, highly context-specific and conceptually cognate with the case-by-case character of the English system of discretionary planning.

5.3 The existing system by which developer contributions are exacted is strongly integrated with the local plan: the amount that can be raised (and the types of public and other goods that can be secured) are governed by each LPA's local plan. In many English local authorities affordable housing and CIL (where it has been introduced) are the only routinely identified requirements, meaning that the scope of what developer contributions can cover in these areas is limited. A core implication of this system is that developers should be able to effectively 'pass on' the costs of developer contributions to landowners so that they are reflected in reduced land values.

5.4 The proposed IL is conceptually quite different in that it sets a levy on total sales income above a threshold of existing use value and development costs and potentially gives local authorities greater flexibility as to what the proceeds can be spent on. The broader scope and remit of the IL means that what developer contributions might be used to finance could potentially grow: IL receipts could be used for affordable housing and community-based infrastructure, as in the existing system, but could also be used to finance other local services as well. The levy is, therefore, best understood as a partially hypothecated sales tax, where the limit on what can be raised is partly determined by the price that the landowner is prepared to accept to release their land.

5.5 On the basis of these first principles the IL is simpler than the existing system especially for developers. The proposed levy would be mandatory in contrast to the discretionary nature of the existing system, and it would eliminate the negotiated aspect of S106 agreements. However, its introduction would be complex as the local determination of minimum thresholds and the number and specific value of levy rates (and the areas to which they each apply) may present a significant challenge to many local authorities in setting their local plans. The possibility of using planning conditions to secure site mitigation which are now secured through S106 agreements may also have significant implications.

5.6 It should also be noted that not all development would necessarily be handled through the IL – although the amount available would be defined by the system. Developer contributions on large and/or complex developments may still be handled through S106 as well as planning conditions potentially on all sites. It will consequently be essential that there is clarity about the circumstances under which a development would be considered 'normal' and, the criteria of complexity and/or size that could be unequivocally identified as warranting planning obligations/CIL. The relevance of this point is intimately related to the question of how IL operates in practice and any behavioural shifts it might prompt amongst all parties to the development process: local authorities, land promoters, planning consultants and the development industry itself. Our modelling presupposes a certain and homogeneous world with no abnormal costs. Importantly given the diversity of sites, landowners and the development industry there will be different outcomes from levy rates and threshold depending on varying landownership and developer characteristics.

What might be the effects of changing the system by which developer contributions are secured?

5.7 The criterion set out in the 2020 White Paper for the introduction of the Infrastructure Levy is that it should provide an equivalent or greater level of developer contributions than the existing system as well as specifically for affordable housing.

5.8 In this study we have modelled income and costs across a specific set of case study authorities and types of development to illustrate what might be achieved. It should be noted that, whilst care has been taken to choose case studies to represent a variety of development contexts, a limited set of six local authorities cannot represent a statistically robust cross section of England. They should be seen as illustrative. Also, case study developments within each local authority were selected by the local authorities in consultation with the research team. Some types of development were not included, specifically offices and retail.

5.9 Our findings, reported in Chapters 3 and 4 and Appendix 1, show that twenty of the twenty-four modelled developments have a 'positive' IL window: the set of values within which the relevant case study local authority might in principle choose to set IL. They range from a lower bound that would be equivalent to the operation of the existing system set at policy-compliant levels of developer contributions to an upper bound beyond which development of the modelled type would be unviable. In many cases this ‘window’ of values that IL might take is wide, particularly in greenfield contexts.

5.10 It should be noted that this concept of the IL ‘window’ is dependent upon a range of assumptions that must be invoked to conduct the modelling set out in Appendix 1. In reality, some of these assumptions will not hold. For example, the lower bound estimate for the IL is, necessarily, pegged to a policy-compliant current S106 and CIL (where charged) requirement under the existing system. However, there is evidence that local authorities *do not* routinely achieve policy-compliant outcomes (Lord et al., 2018, 2020). It is, therefore, likely that in some instances the lower bound – the rate for the IL rate that would equate to what is achieved in practice – may be lower. Indeed, of the four models that have a ‘negative’ window (B2, B3, D3, F3) the explanation for this outcome is that the lower bound is set at an unrealistically high level – reflecting the fact that local policy requirements may not be consistent with development viability in lower value areas within these authorities and may in practice be revised downwards on a case-by-case basis. Similarly, the upper bound is constrained mainly by the preservation of Benchmark Land Value as the basis on which land would become available. However, little is known about the degree to which this is a robust measure of the values necessary to incentivise landowners to release sites for development. If BLV is not an accurate reflection of a return to the landowner sufficient to incentivise site release the estimated upper bound will correspondingly be lowered.

5.11 Having noted these caveats it is still important to conclude that in most of the modelled developments, the IL window provides local authorities with a significant degree of flexibility and discretion to set IL rates attuned to local circumstances – given that the assumptions on which the estimates are based hold. As identified in Chapter 3 the breadth of the IL window is effectively determined by two variables: the costs and the sales proceeds of development. In uncomplicated greenfield settings where costs are relatively low and predictable the window of values that IL might take is often much wider than in complex brownfield contexts where costs are typically greater and more unpredictable. Similarly, the size and upper bound of the window for residential developments are strongly determined by existing property prices. The highest value markets have a larger range of values that the IL might conceivably take and a higher upper bound relative to lower value markets. These findings are clear from a general comparison of the greenfield and brownfield models contained in Appendix 1 and discussed in Chapter 3.

5.12 A more general point that is outside the scope of this research is the broader implications of introducing the IL for the national system of corporation tax and stamp duty land tax. In this regard the question of where the charge on development should be crystallised is highly relevant. The current system makes a cost-based assessment of what attendant investment would be required to make a development acceptable in planning terms. The conceptual shift to a sales-based levy on the proceeds of development may well raise more in some cases. However, if the IL rate as locally set approached the ceiling of what is possible for the market to bear, this could clearly influence developer's profitability as well as land values and correspondingly on corporation tax and SDLT receipts raised on the sector. The introduction of the IL will entail intricate trade-offs between the way developer contributions policies are managed locally and the broader national taxation system that applies to real estate developers uniformly. Our goal in this research has been to focus on the locally determined half of this question by comparing the existing system of S106 and CIL to IL in specific case studies. In addition, any increase in local authority income compared to the existing system might enable such authorities to increase spending on general services not just on the infrastructure and needs arising from the development. This could in turn affect the level of revenue support grant received by local authorities.

Would the IL cover a larger proportion of all development types?

5.13 The existing system has in practice tended to focus on securing contributions from residential development in the form of affordable homes and other community needs and infrastructure related to the site development itself. It has rarely sought contributions from non-residential development, with some retail being an exception. Good examples of what might come within the scope of IL, given there is an intention to limit exemptions can be seen in the models described in Chapter 3, such as the purpose-built student accommodation in Model B4.

5.14 A similar observation can also be made for small residential developments. Because most local authorities do not place an affordable housing requirement on developments of fewer than 10 dwellings these small sites generally do not attract developer contributions of this type. By contrast the IL as conceived in this document would apply to all but custom and self-build residential development and, as a result, all other small developments would fall within the scope of the IL.

5.15 The above observation would potentially greatly increase the scope of IL to capture value from a broader set of developments, and thus, at least in principle secure more than the existing system does from the mainly large-scale residential developments. However, there is no evidence base on the fraction of planning applications that currently fall into this 'small' category, nor the aggregate gross development values of these applications (or the difference between GDV and threshold value). Further research would be necessary to establish the scale of developments that would become liable for IL that would have historically been effectively outside the scope of local developer contributions policies and the potential differences in values achieved through the IL. On the other hand, if there were to be a greater emphasis on brownfield developments than is currently the case, this is likely to diminish how much funding IL can secure compared with the existing S106 and CIL regimes and the current green/brownfield balance.

How might the IL be used to govern development outcomes?

5.16 The specific modelled outcomes for individual case studies contained in Chapter 3 and the analysis contained in Chapter 4 would suggest that the most significant determinant of the IL's performance within a local authority context are prevailing market conditions as measured by new build development values. The similarities between the modelled outcomes for case studies D, E and F serves to illustrate this point.

5.17 On this basis it might be argued that there is a strong argument that the IL rate in areas with the same, or similar, market conditions should be identical, but this would go against the current emphasis on local decision making

5.18 However, an IL that is locally determined has the potential to be influenced by a range of factors not just locally specific development values. Any effects on the geography of development because of neighbouring local authorities applying different IL rates lies outside the scope of this research. More generally, there is very little evidence on how spatially tied or footloose the development industry is. Further research would be desirable on the substitutability of development sites in different local authorities and the degree to which varying levels of IL would influence developer behaviour regarding this variable.

5.19 This question of the geography of developer contributions raised and invested has a larger national implication. Previous research on developer contributions in England (Lord et al., 2018, 2020) has illustrated the scale of the differential in what has been raised between regions. At the time of the most recent study, of the £7bn total agreed £3.6bn (53%) was generated and spent in London. By contrast just 3%, £189m, was raised and spent in the North East. Our research in this document would suggest that the proposed IL, as with the existing system, would be most effective in higher value settings.

Could the IL result in more affordable housing?

5.20 In all the modelling work conducted in Chapter 3 the value of contributions to affordable housing has been held constant: an equivalent value of affordable housing has been maintained under the modelling of the proposed IL as prevailed under the S106 and CIL models. Under the existing system local authorities have the discretion to require a blend of different types of affordable housing products on a site-by-site basis, although they are now required to have a specific proportion of First Homes amongst this mix. This would remain the case under the proposed IL. So, assuming no change in the blend of affordable housing types required by local authorities an equivalent number of units would, by assumption, follow under the IL as under the existing system.

5.21 However, it should be noted that the IL provides local authorities with a great degree of flexibility. In circumstances where a greater proportion of development value could be captured local authorities may have more resources available to provide for a greater number of affordable dwellings. Equally, in parts of England where affordability is less acute local decision making may choose to prioritise infrastructure or other public goods, but this is of course something they can do currently.

Would the system diminish negotiation? What should be the residual role for S106?

5.22 The results in this report show the outcomes of modelling the comparative effects of the existing system of developer contributions and the proposed IL. However, there may continue to be a requirement for S106 on large and complex sites where it will remain necessary for development to be accompanied by the provision of site-specific, in-kind contributions in the form of essential infrastructure and public goods. One key requirement will be to ensure that these in kind and financial payments under a continuing S106 regime are equivalent to what an IL contribution would have been on the same site. In this way there will be 'horizontal' equity in the treatment of developers and landowners under different contributions regimes.

5.23 If there is to be a residual role for S106 in these specific circumstances it implies that further guidance on what would count as a large and/or complex site will be essential to make a clear distinction between the majority of cases where the IL would replace the existing system and the presumably small number of cases but with high value, where S106 may still be employed.

5.24 Without this level of prescription there is a danger that many sites will be identified as 'abnormal' and effectively taken out of the scope of IL and back into the negotiated process of S106 agreements. Without very clear guidance on the specific circumstances where S106 planning obligations might be appropriate there is a danger that the simplicity of the new system will be compromised by debate and negotiation between developers and local authorities on this issue. In addition, in circumstances where planning conditions may be used to secure contributions it will presumably be necessary to ascertain the costs of complying with these conditions and include these costs as part of the minimum threshold.

Are LPAs ready for the IL?

5.25 The scale of reform implied by a shift from the existing system by which developer contributions are exacted to the proposed IL will inevitably place a new set of demands on local authorities.

5.26 All of the local authorities that participated in the research argued that the process by which levy rates and minimum thresholds would be determined would require significant guidance from central government. Issues that were raised in relation to this point included the specific measure of developer profitability that should be used in viability assessment and a common framework for the determination of benchmark land value.

5.27 Moreover, even with guidance in place there will be potential for significant local variations depending on how local authorities seek to use the IL. For example, some may seek to maximise revenues, some may use it defensively as a quasi-instrument of development control whilst others may pursue a pro-development agenda through setting ‘low’ rates.

5.28 Decision makers may wish to consider how tightly defined guidance will need to be to ensure that LPAs are able to get the IL ‘off the ground’. This will inevitably include guidance on exemptions/exclusions and the specification of those circumstances where a development might legitimately fall outside the IL regime.

Further questions for decision makers

5.29 Finally, there are four outstanding questions that are particularly relevant for decision makers:

5.30 First, it will be important for decision makers to reflect carefully on the potential impacts of the IL on the development industry. For example, it is probable that the IL may prompt developers to reconsider both where and what they develop in response to the landscape of IL rates. There may also be variability in some of these behavioural shifts prompted by the introduction of the IL across the development industry: in particular SME and volume developers may respond differently to the IL.

5.31 Second, the scale of reform implied by the replacement of the existing system with the proposed IL is likely to take a considerable time to implement. A range of possible scenarios can be imagined over such a transition period: some developers may rush to get applications in before the introduction of the new, unknown, system; other developers may choose to wait in the expectation that the new system will be better for them. Others (as well as land owners) may wait in the expectation that the new system is itself subject to modification. All three scenarios have historical echoes with previous moments of reform, such as in1966 when the Land Commission was set up.

5.32 Third, many of the core decisions on the local operation of the IL, such as the determination of IL rate(s), minimum thresholds and the status of large sites, will need to be taken as part of the local plan making and adoption process. Implementing the IL within this context will extend the work currently underway in local authorities to prepare and adopt up to date local plans.,.

5.32 Fourth, a locally raised and spent IL will result in the highest value sites returning the greatest value of developer contributions. It is, therefore, likely that a shift to the IL would reinforce the geographic inequalities already evident in the current system. Further evidence on this issue would be welcome - a goal that may be supported by a process of testing, trialling and real-world learning on the operation of the IL in practice. This may help decision makers to refine the design of the IL to support government's wider levelling-up agenda.

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Appendix 1: Modelling Results

Case Study A: London Borough

Local context

A1.1 As with all local authorities in England the local housing development context is shaped by the standard method for the assessment of housing need and the five-year land supply. This approach to assessing the scale of new residential development required in the local authority uses a range of inputs that fall into two categories: an affordability ratio and demographic forecast of future household formation.

A1.2 These measures provide a useful starting point with respect to illustrating the general character of the local authority and the specific geography of development pressure.

A1.3 Case Study A has a median house price in the region of £550,000 per dwelling and has seen an increase in the house prices for each of the previous five years. Median incomes in the borough are in the region of £32,000 and have remained largely static over the last five years. This has resulted in an increase in the affordability ratio of median incomes to median house prices over the last five years. In 2020 median house prices were approximately 16 times median incomes.

A1.4 The other principal ingredient in the standard method for the assessment of housing need is the relationship between new dwellings completed and the scale of household growth forecast to take place in the local authority. For Case Study A over the five-year period 2016-2020, the scale of new housing delivered has been, on average approximately, 1,500 dwellings per annum. As year-on-year household growth has been averaging approximately 3,000 more households per year, recent housing delivery is just below half of what household growth in the borough would suggest is required.

A1.5 In order to estimate new build house prices in local authority Case Study A we take land registry price paid data and apply a local authority-specific uplift to reflect the locally specific premium paid for new builds in comparison to the secondary market for new dwellings. For Case Study A this premium is 1.5% and is used to compute the values set out in Table A1.1. It should also be noted that the land registry price paid data excludes all categories of affordable housing, the sale of right-to-buy properties, transfers and actions resulting from the enactment of Compulsory Purchase Order powers and court orders.

A1.6 Tables A1.1 and A1.2 provide useful contextual detail on the scale of new development that has been delivered in Case Study A over the past 5 years and how this relates to the drivers of development pressure. However, Tables

A1.1 and A1.2 report local authority-wide averages and consequently mask variability. This is important as, like most local authorities in England, the development context within Case Study A is heterogeneous. For example, an important determinant of how the proposed Infrastructure Levy might work in practice is the value that resides in new build prices. On this measure, Case Study A is highly variable: new build house prices vary between approximately £4,000m² and £16,000m² across the full extent of the Lower super output areas (LSOAs) that comprise the local authority.

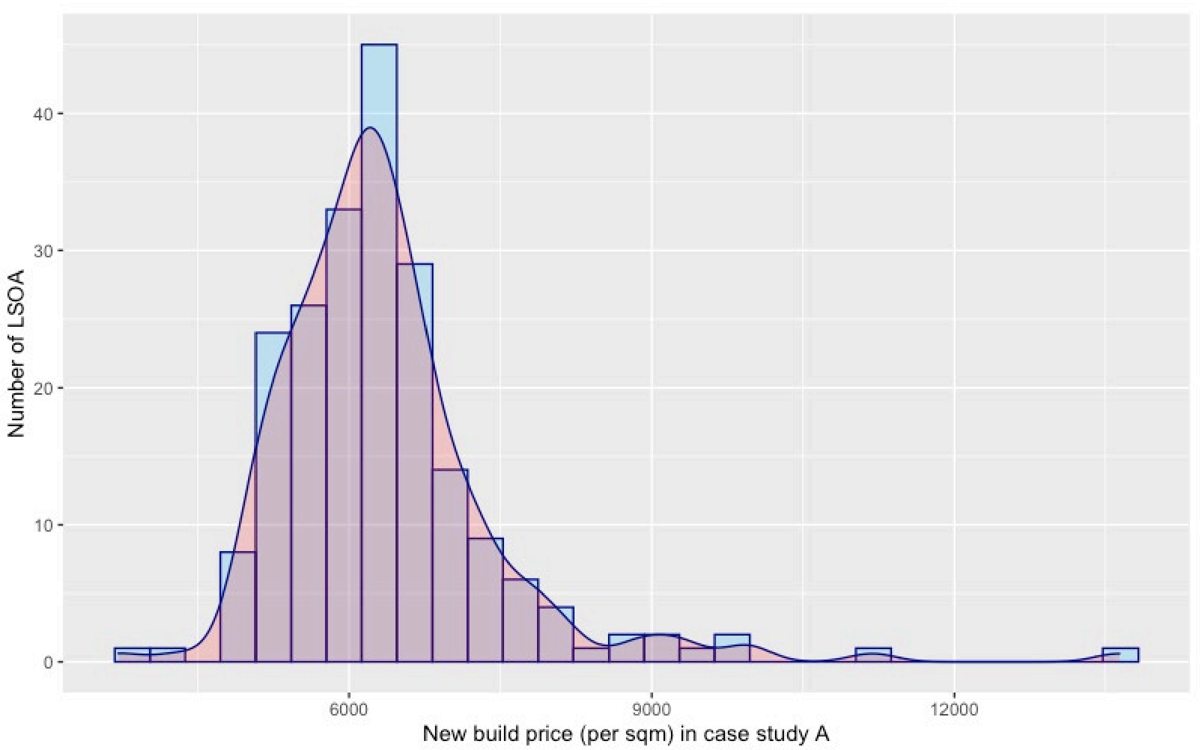
A1.7 Development values for new build house prices vary by a factor of approximately 4 across Case Study A with corresponding implications for how the proposed Infrastructure Levy might function regarding development viability on some sites in lower value contexts. It is clear from this observation that modelling work will have to encompass residential development in a variety of market contexts within Case Study A. Summary statistics on the variability in new build residential prices is contained in Table A1.1 and Figure A1.1.

Table A1.1: Estimated new build house prices in Case Study A (2020)

House price	Average	1st quartile	Median	3rd quartile
New Build	730,000	420,000	580,000	820,000
New Build £/m²	6,500	5,500	6,000	7,000

Source: Authors' calculations from HMLR 'price paid' data

Figure A1.1: Approximate new build house prices by LSOA in Case Study A (2020)



Source: Authors' calculations from HMLR 'price paid' data

Affordable housing, planning obligations and CIL

A1.8 Local planning policy follows the London-wide goal of 35% affordable housing. Furthermore, like all London boroughs Case Study A is a CIL charging authority. To retain anonymity, we do not provide the exact CIL charging schedule, but CIL rates vary from £0/m^2 for some uses up to the region of £300/m^2 for residential development.

A1.9. The case study has over 1,000 planning applications submitted each year, with an average of more than 500 applications per annum for residential developments in recent years. Of the six case studies considered, Case Study A has one of the more significant rates of higher density development in brownfield contexts and office to residential developments undertaken under permitted development rights.

Model outputs for Case Study A

A1.10 This local authority is a London borough that has relatively high residential values. The median new build sale price in 2020 was approximately £6,000/m^2.

A1.11 The local authority requested four residential schemes to be modelled: a low-density greenfield development (Model A1), two higher density brownfield schemes in higher (Model A2) and median (Model A3) value settings and an office to residential permitted development scheme (Model A4). The types of development that were requested were intended to be indicative of some of the more common forms of development activity experienced in the local authority.

A1.12 Affordable housing contributions reflect local planning policy: 35% affordable housing on all residential development types split as 60% social rented equivalent and 40% intermediate.

Model A1 - Greenfield residential scheme (residential sale value = £7,150/m²)

Model inputs

A1.13 Model A1 is a greenfield development occupying a five-hectare site (gross development area) providing a mixture of low-density apartments and single-family homes.

A1.14 The local authority provided details of appropriate densities and site sizes as well as affordable housing proportions and tenure mixes. The model takes these values as inputs and correspondingly assumes a level of 35% affordable housing split as 60% social rented and 40% intermediate rent.

A1.15 CIL liability comprises Mayoral CIL of £60/m² and an additional borough CIL of £300/m².

The Levy rate 'window'

A1.16 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

A1.17 Assuming a Benchmark Land Value of £1,250,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 91%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model A1 this lower bound estimate value for IL is 34%. Figure A1.2 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

Detailed model outputs

A1.18 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model A1 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table A1.2.

A1.19 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure A1.3.

Figure A1.2: IL ‘window’ diagram for Model A1

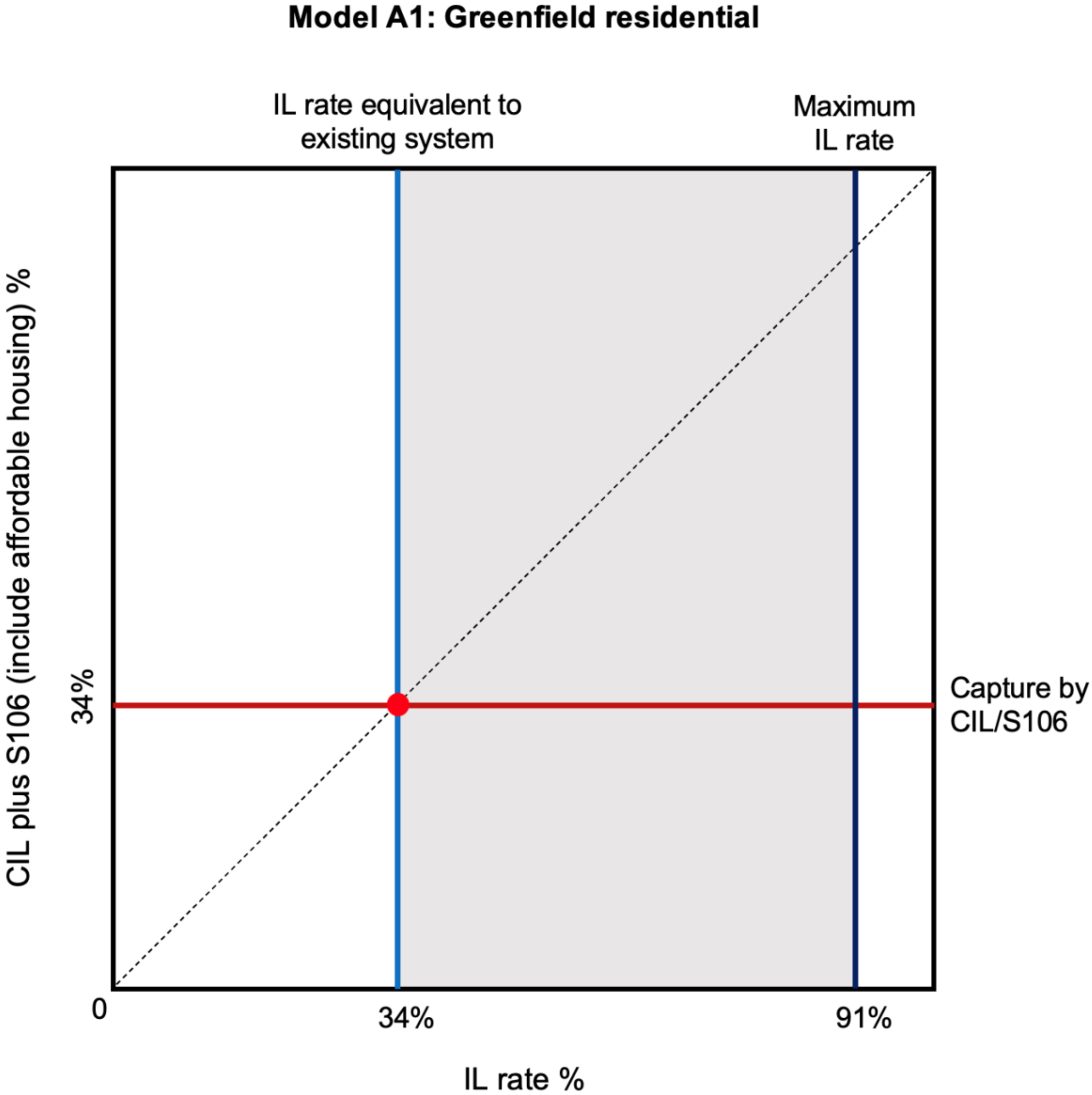
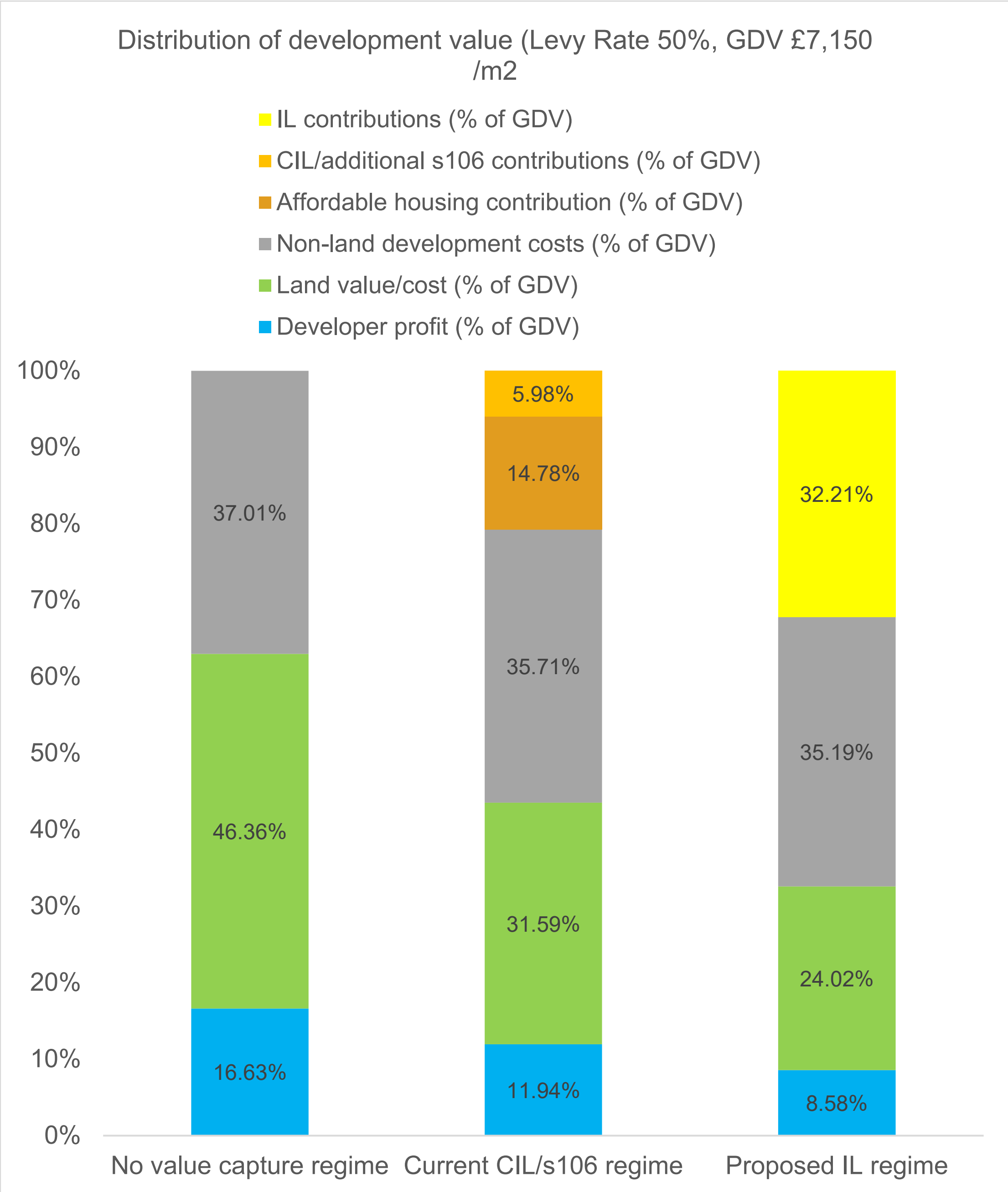


Table A1.2: Detailed model outputs for model A1

Key outputs	No LVC	CIL/S106	IL
GDV £ /m² (before AH discounts)	£7,150	£7,150	£7,150
Affordable housing discount value (£/m² of scheme area)	£0	£1,057	£1,057
CIL/S106 (£/m² of scheme area)	£0	£428	£0
Gross IL (£/m² of scheme area)	£0	£0	£2,303
Net of affordable housing IL (£ /m² of scheme area)	£0	£0	£1,246
Affordable housing discount as a % of value capture	n/a	71%	46%
Estimated land value (£/m² of NDA)	£1,119	£762	£580
Estimated land value (£/ha NDA)	£11,187,832	£7,622,938	£5,795, 942
Estimated land value (£/ha GDA)	£6,712,699	£4,573,763	£3,477,565
Estimated total land value uplift above EUV (£ /m² of NDA)	£952	£596	£413
Land value uplift captured (£ /m² of NDA)	£0	£356	£539
% of total uplift captured	0%	37.44%	56.63%
Total developer investment (£)	£39,100,133	£27,215,427	£21,221,108
Estimated developer profit from project (£)	£12,037,486	£8,643,958	£6,208,358
Developer profit (£ /m² of scheme area)	£1,189	£854	£613
Profit margin (% of GDV)	16.63%	14.01%	10.06%
Profit margin (% of development costs)	19.94%	16.29%	11.43%
ROCE	30.79%	31.76%	29.26%
Equity multiple	1.31	1.32	1.29
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
EUV	£1,000,000		
Premium	25%		
Benchmark Land Value	£1,250,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	34%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£1,551		
Maximum Viable IL Rate (%)	91%		
Maximum Viable IL Rate (£/m²)	£4,175		

Figure A1.3: The distribution of GDV under the three scenarios



Source: Authors’

Model A1 - Interpretation

Minimum threshold

A1.20 The minimum threshold for model A1 is £2,544/m².

Developer contributions

A1.21 Model A1 shows a total land value capture under the existing system of 20.76% of which 14.78% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 5.98% through CIL and non-affordable housing S106 contributions (the light blue shaded area).

A1.22 The IL set at an arbitrary nominal rate of 50% recovers 32.21% of the Gross Development Value (the green shaded area), 11.45% greater than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL, 14.78% of GDV would go to maintaining levels of affordable housing, leaving 17.43% of GDV available for contributions to infrastructure and public goods.

Land values

A1.23 Land values are diminished because of the imposition of any system of land value capture. In the policy-free scenario, land values account for 46.36% of the total available Gross Development Value. This falls to 31.59% under the existing system and to 24.02% under the proposed IL.

A1.24 In the case of the IL scenario set at the arbitrary rate of 50%, around £5.7 million of the land value is being captured resulting in a reduction of 48% compared to the land value estimate assuming zero developer contributions.

A1.22 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs

Model A1 - Sensitivity analyses

Table A1.3: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on land value estimate (£/ha GDA)

		Minimum Threshold (£/m²)						
	£3,477,565	**£1,900**	**£2,100**	**£2,300**	**£2,500**	**£2,700**	**£2,900**	**£3,100**
Infrastructure Levy	**10%**	£6,068,806	£6,097,952	£6,127,099	£6,156,245	£6,185,391	£6,214,538	£6,243,684
	20%	£5,303,713	£5,362,005	£5,420,298	£5,478,591	£5,536,884	£5,595,177	£5,653,470
	30%	£4,538,620	£4,626,059	£4,713,498	£4,800,938	£4,888,377	£4,975,816	£5,063,256
	40%	£3,773,527	£3,890,112	£4,006,698	£4,123,284	£4,239,870	£4,356,455	£4,473,041
	50%	£3,008,434	£3,154,166	£3,299,898	£3,445,630	£3,591,362	£3,737,095	£3,882,827
	60%	£2,243,341	£2,418,219	£2,593,098	£2,767,976	£2,942,855	£3,117,734	£3,292,612
	70%	£1,478,248	£1,682,273	£1,886,298	£2,090,323	£2,294,348	£2,498,373	£2,702,398
	80%	£713,155	£946,326	£1,179,498	£1,412,669	£1,645,841	£1,879,012	£2,112,184

Table A1.4: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on estimated land value uplift captured (% of land value uplift)

		Minimum Threshold (£/m²)						
	£1	**£1,900**	**£2,100**	**£2,300**	**£2,500**	**£2,700**	**£2,900**	**£3,100**
Infrastructure Levy	**10%**	11%	11%	10%	10%	9%	9%	8%
	20%	25%	24%	23%	22%	21%	20%	19%
	30%	38%	37%	35%	33%	32%	30%	29%
	40%	51%	49%	47%	45%	43%	41%	39%
	50%	65%	62%	60%	57%	55%	52%	50%
	60%	78%	75%	72%	69%	66%	63%	60%
	70%	92%	88%	84%	81%	77%	74%	70%
	80%	105%	101%	97%	93%	89%	85%	81%

Table A1.5: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on IL receipt (£/m² of scheme area)

		Levy rate (%)						
Minimum threshold (£/m²)	£2,303	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
	£3,100	£810	£1,215	£1,620	£2,025	£2,430	£2,835	£3,240
	£2,900	£850	£1,275	£1,700	£2,125	£2,550	£2,975	£3,400
	£2,700	£890	£1,335	£1,780	£2,225	£2,670	£3,115	£3,560
	£2,500	£930	£1,395	£1,860	£2,325	£2,790	£3,255	£3,720
	£2,300	£970	£1,455	£1,940	£2,425	£2,910	£3,395	£3,880
	£2,100	£1,010	£1,515	£2,020	£2,525	£3,030	£3,535	£4,040
	£1,900	£1,050	£1,575	£2,100	£2,625	£3,150	£3,675	£4,200

Table A1.6: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate sensitivity table: impact on land value estimate (£/ha GDA) Levy rate = 50%

		Private housing prices (£/m²)						
Base build costs (£ /m²)	£3,477,565	**£5,500**	**£6,000**	**£6,500**	**£7,000**	**£7,500**	**£8,000**	**£8,500**
	£1,000	£3,006,127	£3,355,646	£3,705,166	£4,054,686	£4,404,205	£4,753,725	£5,103,245
	£1,200	£2,778,801	£3,128,321	£3,477,841	£3,827,360	£4,176,880	£4,526,400	£4,875,919
	£1,400	£2,551,476	£2,900,996	£3,250,515	£3,600,035	£3,949,554	£4,299,074	£4,648,594
	£1,600	£2,324,151	£2,673,670	£3,023,190	£3,372,709	£3,722,229	£4,071,749	£4,421,268
	£1,800	£2,096,825	£2,446,345	£2,795,864	£3,145,384	£3,494,904	£3,844,423	£4,193,943
	£2,000	£1,869,500	£2,219,019	£2,568,539	£2,918,059	£3,267,578	£3,617,098	£3,966,617
	£2,200	£1,642,174	£1,991,694	£2,341,214	£2,690,733	£3,040,253	£3,389,772	£3,739,292

Model A2 - Brownfield scheme at upper quartile house prices (£7,150/m²)

Model inputs

A2.1 Model A2 is a brownfield development occupying a one-hectare site providing a high-density development of 400 residential units in a higher value setting.

A2.2 As with model A1, the local authority provided details of appropriate densities and site sizes as well as affordable housing proportions and tenure mixes. The model takes these values as inputs and correspondingly assumes a level of 35% affordable housing split as 60% social rented and 40% intermediate rent.

A2.3 CIL liability comprises Mayoral CIL of £60/m² and an additional borough CIL of £300/m².

The Levy rate 'window'

A2.4 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work was undertaken to identify the range of values that the IL might take with respect to this development type.

A2.5 Assuming a Benchmark Land Value of £7,500,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 63%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model A2 this lower bound estimate value for IL is 41%. Figure A2.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

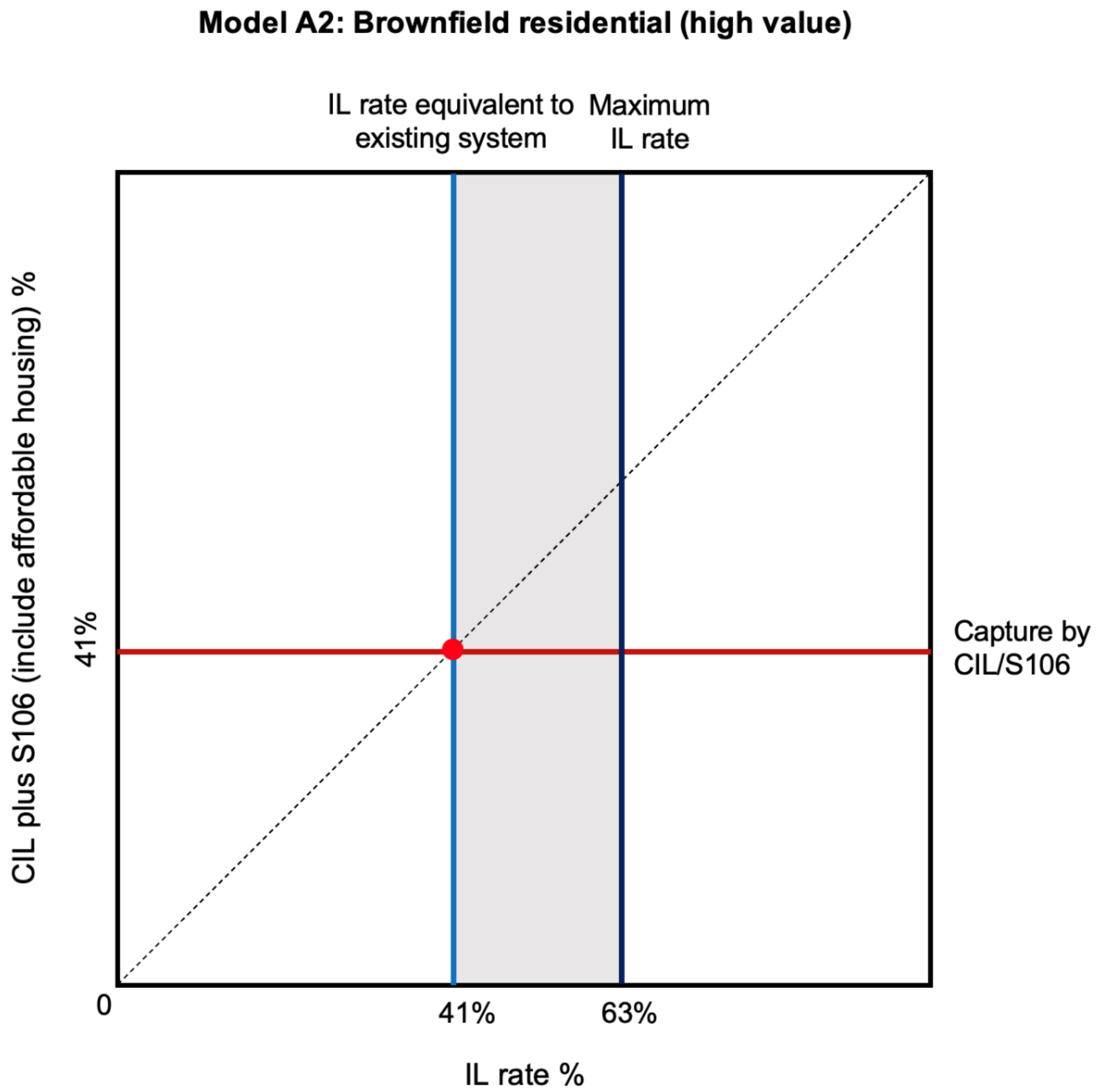
A2.6 On the basis of this analysis there may be scope for developer contributions above the levels modelled as the policy-compliant existing system - assuming the Benchmark Land Value accurately represents the cost of the land.

Model outputs

A2.7 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model A2 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table A2.1.

A2.8 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure A2.2.

Figure A2.1: IL 'window' diagram for model A2



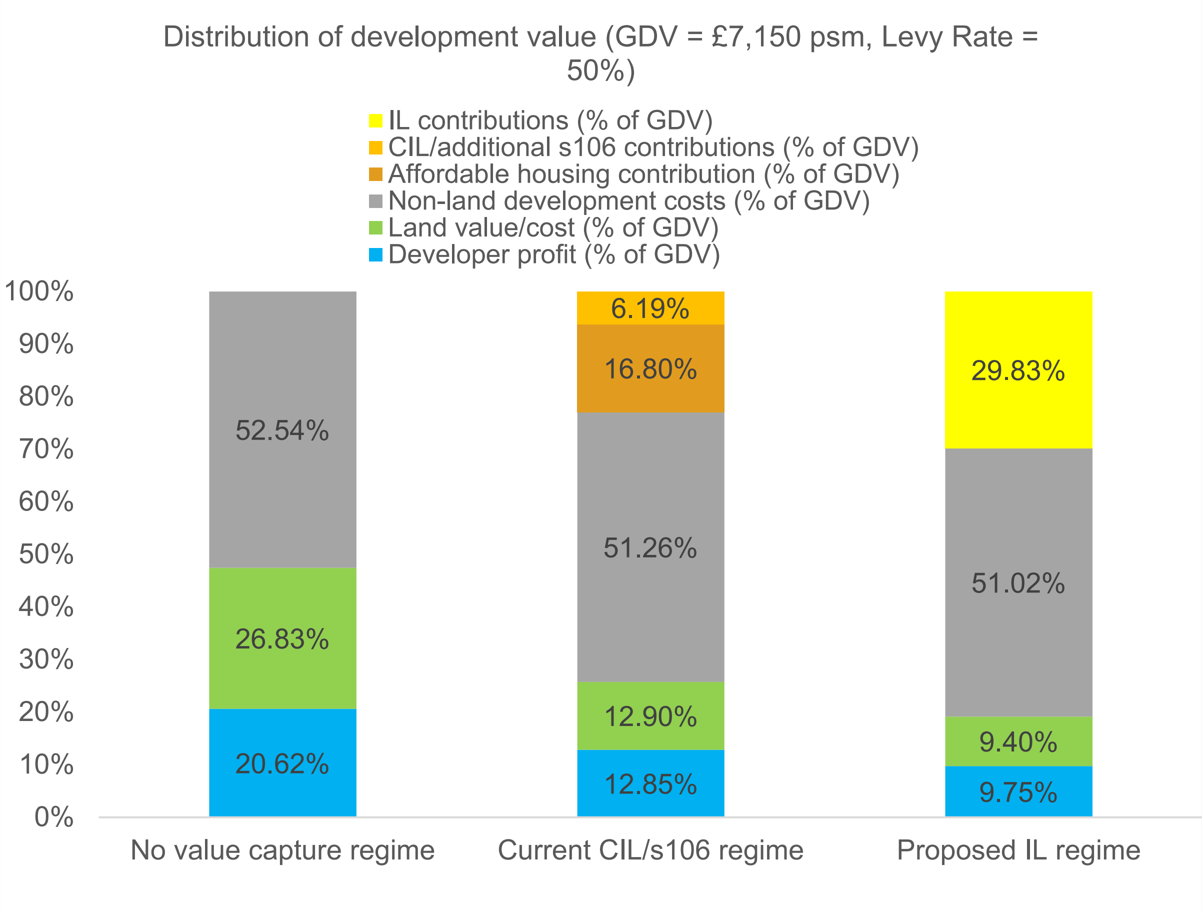
Source: Authors'

Table A2.1: Detailed model outputs for model A2

Key outputs	No LVC	CIL/S106	IL
GDV £ /m² (before AH discounts)	£7,150	£7,150	£7,150
Affordable housing discount value (£/m² of scheme area)	£0	£1,201	£1,201
CIL/S106 (£/m² of scheme area)	£0	£385	£0
Gross IL (£/m² of scheme area)	£0	£0	£2,133
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£931
Affordable housing discounts as a % of value capture	n/a	76%	56%
Estimated land value (£/m² of NDA)	£4,605	£2,214	£1,614
Estimated land value (£/ha NDA)	£46,047,181	£22,141,996	£16,138,893
Estimated total uplift above EUV (£/m² of NDA)	£4,005	£1,964	£1,364
Land value uplift captured (£/m² of NDA)	£0	£2,041	£2,641
% of total uplift captured	0%	50.95%	65.94%
Total developer investment (£)	£128,135,549	£101,471,639	£87,047,340
Estimated developer profit from project (£)	£35,391,103	£22,046,556	£16,730,575
Developer profit (£/m² of scheme area)	£1,475	£919	£697
Profit margin (% of GDV)	20.62%	15.44%	11.72%
Profit margin (% of development costs)	25.98%	18.26%	13.39%
ROCE	27.62%	21.73%	19.22%
Equity multiple	1.28	1.22	1.19
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
EUV	£6,000,000		
Premium	25%		
Benchmark Land Value	£7,500,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	41%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£1,755		
Maximum Viable IL Rate (%)	63%		
Maximum Viable IL Rate (£/m²)	£2,676		

Source: Authors'

Figure A2.2: The distribution of GDV under the three scenarios



Source: Authors'

Model A2 - Interpretation

Minimum threshold

A2.9 The minimum thresholds for brownfield, high density projects are generally higher than greenfield sites because of higher existing use values and the increased construction costs associated with tall buildings that have communal areas. The minimum threshold for Model A2 is £2,885/m^2.

Developer contributions

A2.10 Model A2 shows a total scale of developer contributions under the existing system of 22.99% of which 16.80% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 6.19% through CIL and non-affordable housing S106 contributions (the red shaded area).

A2.11 The proposed IL set at a nominal rate of 50% recovers 29.83% of the Gross Development Value (the green shaded area), 6.84% greater than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems, this would effectively mean that, for the total exaction achieved under the IL, 16.80% of GDV would go to maintaining levels of affordable housing, leaving 13.03% of GDV available for infrastructure and public goods.

Land values

A2.12 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario, land values account of 26.83% of the total available Gross Development Value. This falls to 12.90% under the existing system and to 9.4% under the proposed IL.

A2.13 The land value reduction suggests then that around £22 million of the land value is being captured under the existing system.

A2.14 Under the IL modelled at the hypothetical rate of 50% around £16 million of the land value is being captured.

A2.15 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs

Model A2 - Sensitivity analyses

Table A2.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on land value estimate (£/ha NDA)

		Minimum Threshold (£/m²)						
	£16,138,893	**£2,300**	**£2,500**	**£2,700**	**£2,900**	**£3,100**	**£3,300**	**£3,500**
Infrastructure Levy	**10%**	£42,319,432	£42,637,254	£42,955,075	£43,272,897	£43,590,718	£43,908,539	£44,226,361
	20%	£34,612,263	£35,247,906	£35,883,549	£36,519,191	£37,154,834	£37,790,477	£38,426,120
	30%	£26,905,093	£27,858,558	£28,812,022	£29,765,486	£30,718,950	£31,672,415	£32,625,879
	40%	£19,197,924	£20,469,210	£21,740,495	£23,011,781	£24,283,067	£25,554,352	£26,825,638
	50%	£11,490,755	£13,079,862	£14,668,969	£16,258,076	£17,847,183	£19,436,290	£21,025,397
	60%	£3,783,585	£5,690,514	£7,597,442	£9,504,371	£11,411,299	£13,318,228	£15,225,156
	70%	-£3,923,584	-£1,698,834	£525,916	£2,750,665	£4,975,415	£7,200,165	£9,424,915
	80%	-£11,630,754	-£9,088,182	-£6,545,611	-£4,003,040	-£1,460,468	£1,082,103	£3,624,674

Table A2.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on estimated land value uplift captured (% of land value uplift)

		Minimum Threshold (£/m²)						
	£1	**£2,300**	**£2,500**	**£2,700**	**£2,900**	**£3,100**	**£3,300**	**£3,500**
Infrastructure Levy	**10%**	1%	0%	-1%	-2%	-3%	-3%	-4%
	20%	20%	18%	17%	15%	13%	12%	10%
	30%	39%	37%	34%	32%	30%	27%	25%
	40%	58%	55%	52%	49%	46%	42%	39%
	50%	78%	74%	70%	66%	62%	58%	54%
	60%	97%	92%	87%	83%	78%	73%	68%
	70%	116%	110%	105%	99%	94%	88%	83%
	80%	135%	129%	123%	116%	110%	104%	97%

Table A2.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on IL receipt (£/m² of scheme area)

Minimum threshold (£/m²)		Levy rate (%)						
	£2,133	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
	£2,300	£970	£1,455	£1,940	£2,425	£2,910	£3,395	£3,880
	£2,500	£930	£1,395	£1,860	£2,325	£2,790	£3,255	£3,720
	£2,700	£890	£1,335	£1,780	£2,225	£2,670	£3,115	£3,560
	£2,900	£850	£1,275	£1,700	£2,125	£2,550	£2,975	£3,400
	£3,100	£810	£1,215	£1,620	£2,025	£2,430	£2,835	£3,240
	£3,300	£770	£1,155	£1,540	£1,925	£2,310	£2,695	£3,080
	£3,500	£730	£1,095	£1,460	£1,825	£2,190	£2,555	£2,920

Table A2.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate Sensitivity Table: Impact on land value (£) (Levy Rate = 50%)

Base build costs (£/m²)		Market housing prices (£/m²)						
	£16,138,893	**£6,400**	**£6,600**	**£6,800**	**£7,000**	**£7,200**	**£7,400**	**£7,600**
	£1,900	£15,806,950	£17,297,619	£18,788,289	£20,278,958	£21,769,628	£23,260,297	£24,750,967
	£2,000	£14,054,261	£15,544,930	£17,035,600	£18,526,269	£20,016,939	£21,507,608	£22,998,278
	£2,100	£12,301,571	£13,792,241	£15,282,910	£16,773,580	£18,264,249	£19,754,919	£21,245,588
	£2,200	£10,548,882	£12,039,552	£13,530,221	£15,020,891	£16,511,560	£18,002,230	£19,492,899
	£2,300	£8,796,193	£10,286,862	£11,777,532	£13,268,201	£14,758,871	£16,249,540	£17,740,210
	£2,400	£7,043,504	£8,534,173	£10,024,843	£11,515,512	£13,006,182	£14,496,851	£15,987,521
	£2,500	£5,290,815	£6,781,484	£8,272,154	£9,762,823	£11,253,493	£12,744,162	£14,234,832

Model A3 - Brownfield scheme: median house price (£6,200/m²)

Model inputs

A3.1 Model A3 is a brownfield development occupying a one-hectare site providing a high-density development of 400 residential units in a median market setting.

A3.2 As with model A2, the local authority provided details of appropriate densities and site sizes as well as affordable housing proportions and tenure mixes. The model takes these values as inputs and correspondingly assumes a level of 35% affordable housing split as 60% social rented and 40% intermediate rent.

A3.3 CIL liability comprises Mayoral CIL of £60/m² and an additional borough CIL of £300/m².

The Levy rate 'window'

A3.4 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

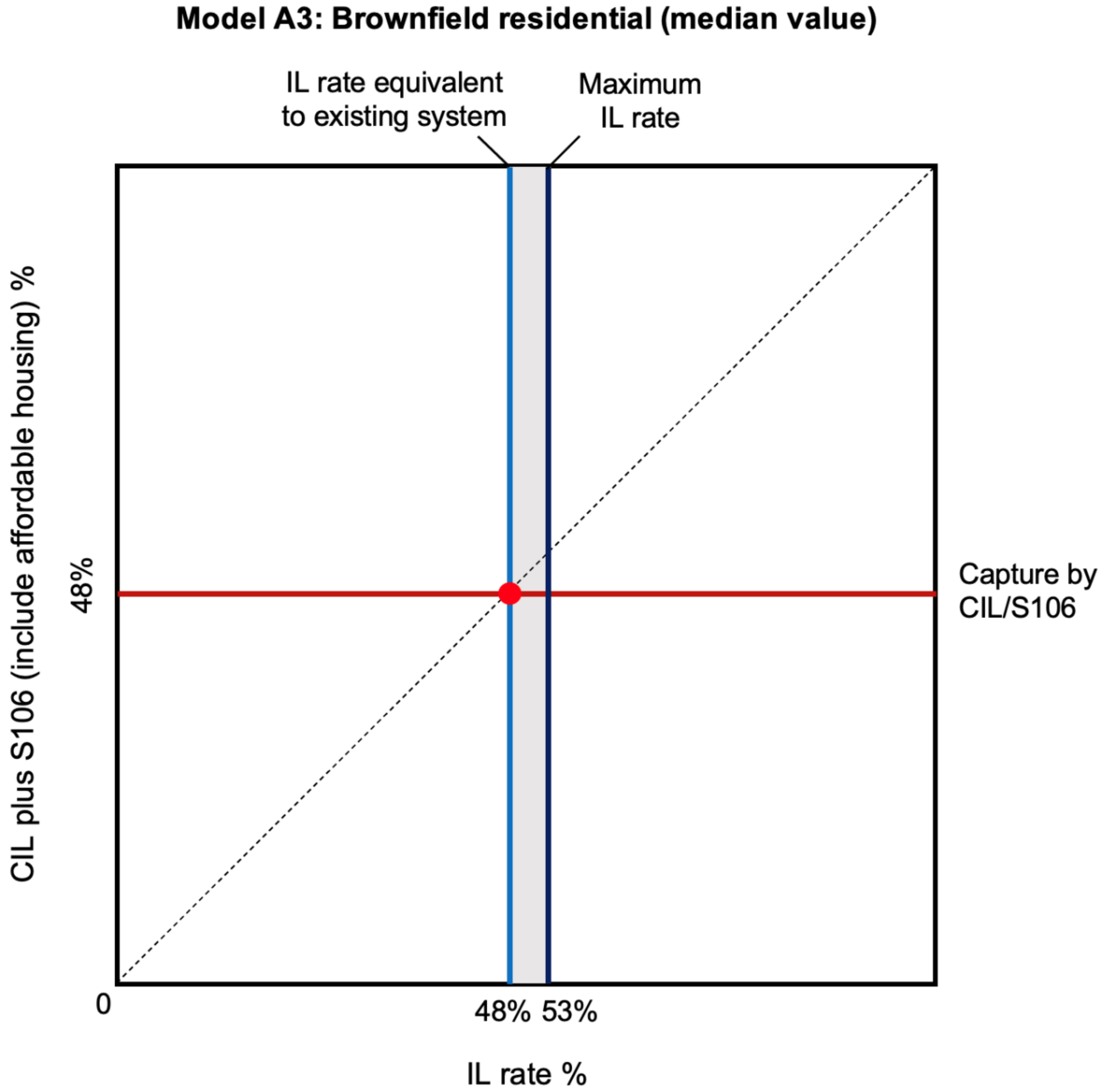
A3.5 Assuming a Benchmark Land Value of £7,500,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 53%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model A3 this lower bound estimate value for IL is 48%. Figure A3.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

Detailed model outputs

A3.6 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model A3 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table A3.1.

A3.7 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure A3.2.

Figure A3.1: IL 'window' diagram for model A3



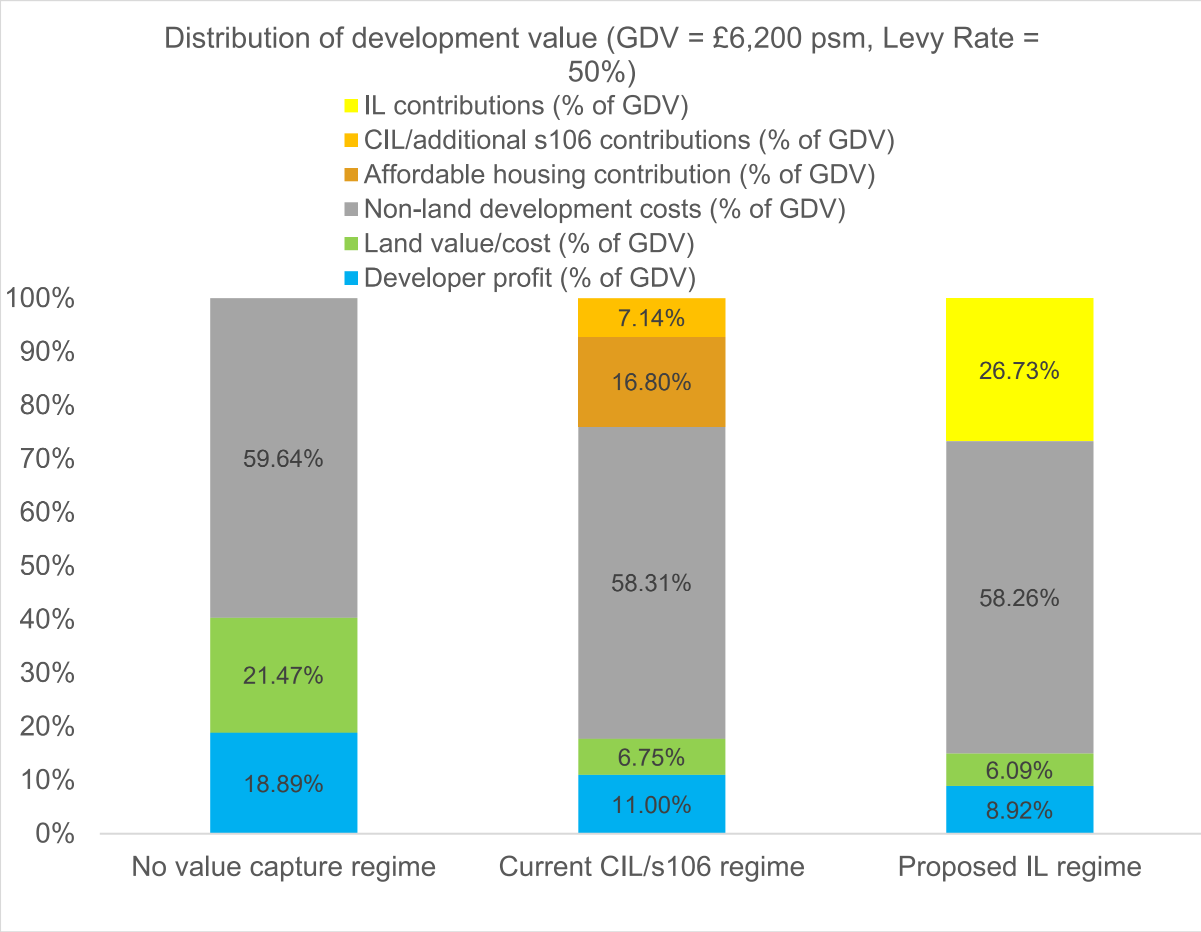
Source: Authors'

Table A3.1: Detailed model outputs for model A3

Key outputs	No LVC	CIL/S106	IL
GDV £ /m² (before AH discounts)	£6,200	£6,200	£6,200
Value of affordable housing discount (£/m² of scheme area)	£0	£1,042	£1,042
CIL/S106 (£ /m² of scheme area)	£0	£385	£0
Gross IL (£ /m² of scheme area)	£0	£0	£1,658
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£616
Affordable housing discounts as a % of value capture	n/a	73%	63%
Estimated land value (£/m² of NDA)	£3,195	£1,005	£906
Estimated land value (£/ha NDA)	£31,946,977	£10,049,547	£9,058,213
Estimated total uplift above EUV (£ /m² of NDA)	£2,595	£405	£306
Land value uplift captured (£/m² of NDA)	£0	£2,190	£2,289
% of total uplift captured	0%	84.39%	88.21%
Total developer investment (£)	£113,076,530	£89,912,303	£79,957,591
Estimated developer profit from project (£)	£28,106,121	£16,371,490	£13,271,860
Developer profit (£ /m² of scheme area)	£1,171	£682	£553
Profit margin (% of GDV)	18.89%	13.22%	10.72%
Profit margin (% of development costs)	23.29%	15.24%	12.08%
ROCE	24.86%	18.21%	16.60%
Equity multiple	1.25	1.18	1.17
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
EUV	£6,000,000		
Premium	25%		
Benchmark Land Value	£7,500,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	48%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£1,595		
Maximum Viable IL Rate (%)	53%		
Maximum Viable IL Rate (£/m²)	£1,756		

Source: Authors'

Figure A3.2: The distribution of GDV under the three scenarios



Source: Authors'

Model A3 - Interpretation

Minimum threshold

A3.8 The minimum threshold for Model A3 is £2,885/m².

Developer contributions

A3.9 Model A3 shows total developer contributions under the existing system of 23.94% of which 16.8% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 7.14% through CIL and non-affordable housing S106 contributions (the red shaded area).

A3.10 The IL modelled at 50% would recover 26.73% of the Gross Development Value (the green shaded area), 2.79% greater than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL, 16.8% of GDV would go to maintaining levels of affordable housing, leaving 9.93% of GDV available for infrastructure and public goods.

Land values

A3.11 Land values are diminished as result of the imposition of any system of developer contributions. In the policy-free scenario land values account for 21.47% of the total available Gross Development Value. This falls to 6.75% under the existing system and to 6.09% under the IL set at a hypothetical modelled rate of 50%.

A3.12 The land value reduction suggests then that around £9 million of the land value is being captured under the existing system.

A3.13 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model A3 - Sensitivity Analyses

Table A3.2: Impact on land values at varying rates of IL and minimum threshold (*source: Authors').*

Bivariate sensitivity table: impact on land value estimate (£/ha NDA)

		Minimum Threshold (£ /m²)						
	£9,058,213	**£2,300**	**£2,500**	**£2,700**	**£2,900**	**£3,100**	**£3,300**	**£3,500**
Infrastructure Levy	**10%**	£29,200,145	£29,517,967	£29,835,788	£30,153,609	£30,471,431	£30,789,252	£31,107,074
	20%	£23,002,628	£23,638,270	£24,273,913	£24,909,556	£25,545,199	£26,180,842	£26,816,485
	30%	£16,805,110	£17,758,574	£18,712,038	£19,665,503	£20,618,967	£21,572,431	£22,525,895
	40%	£10,607,592	£11,878,878	£13,150,163	£14,421,449	£15,692,735	£16,964,021	£18,235,306
	50%	£4,410,074	£5,999,182	£7,588,289	£9,177,396	£10,766,503	£12,355,610	£13,944,717
	60%	-£1,787,443	£119,485	£2,026,414	£3,933,342	£5,840,271	£7,747,199	£9,654,128
	70%	-£7,984,961	-£5,760,211	-£3,535,461	-£1,310,711	£914,039	£3,138,789	£5,363,539
	80%	-£14,182,479	-£11,639,907	-£9,097,336	-£6,554,765	-£4,012,193	-£1,469,622	£1,072,950

Table A3.3: Impact on LVC at varying rates of IL and minimum threshold (*source: Authors').*

Bivariate sensitivity table: impact on estimated land value uplift captured (% of land value uplift)

		Minimum Threshold (£ /m²)						
	£1	**£2,300**	**£2,500**	**£2,700**	**£2,900**	**£3,100**	**£3,300**	**£3,500**
Infrastructure Levy	**10%**	11%	9%	8%	7%	6%	4%	3%
	20%	34%	32%	30%	27%	25%	22%	20%
	30%	58%	55%	51%	47%	44%	40%	36%
	40%	82%	77%	72%	68%	63%	58%	53%
	50%	106%	100%	94%	88%	82%	76%	69%
	60%	130%	123%	115%	108%	101%	93%	86%
	70%	154%	145%	137%	128%	120%	111%	102%
	80%	178%	168%	158%	148%	139%	129%	119%

Table A3.4: Impact on IL receipts at varying rates of IL and minimum threshold c

Bivariate sensitivity table: impact on IL receipt (£/m² of scheme area)

		Levy rate (%)						
Minimum threshold (£/m²)	£1,658	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
	£2,300	£780	£1,170	£1,560	£1,950	£2,340	£2,730	£3,120
	£2,500	£740	£1,110	£1,480	£1,850	£2,220	£2,590	£2,960
	£2,700	£700	£1,050	£1,400	£1,750	£2,100	£2,450	£2,800
	£2,900	£660	£990	£1,320	£1,650	£1,980	£2,310	£2,640
	£3,100	£620	£930	£1,240	£1,550	£1,860	£2,170	£2,480
	£3,300	£580	£870	£1,160	£1,450	£1,740	£2,030	£2,320
	£3,500	£540	£810	£1,080	£1,350	£1,620	£1,890	£2,160

Table A3.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) (*source: Authors').*

Bivariate sensitivity table: impact on land value estimate (£/ha NDA) Levy rate = 50%

		Market housing price (£/m²)						
	£11,363,064	**£5,600**	**£5,800**	**£6,000**	**£6,200**	**£6,400**	**£6,600**	**£6,800**
Base build costs (£ /m²)	**£1,900**	£11,408,815	£13,729,001	£16,049,186	£18,369,372	£20,689,557	£23,009,743	£25,329,928
	£2,000	£9,073,379	£11,393,565	£13,713,750	£16,033,936	£18,354,121	£20,674,307	£22,994,492
	£2,100	£6,737,943	£9,058,129	£11,378,314	£13,698,500	£16,018,685	£18,338,871	£20,659,056
	£2,200	£4,402,507	£6,722,692	£9,042,878	£11,363,064	£13,683,249	£16,003,435	£18,323,620
	£2,300	£2,067,071	£4,387,256	£6,707,442	£9,027,627	£11,347,813	£13,667,998	£15,988,184
	£2,400	-£268,365	£2,051,820	£4,372,006	£6,692,191	£9,012,377	£11,332,562	£13,652,748
	£2,500	-£2,603,801	-£283,616	£2,036,570	£4,356,755	£6,676,941	£8,997,126	£11,317,312
	£2,600	-£4,939,237	-£2,619,052	-£298,866	£2,021,319	£4,341,505	£6,661,690	£8,981,876

Model A4 - Office-to-residential conversion under permitted development rights

Model inputs

A4.1 Model A4 is an office-to-residential permitted development scheme. Since the introduction of office to residential conversion as a Permitted Development Right in 2013, there has been growing interest in this sector. Whilst there is likely to be heterogeneity in the extent and costs of works required for conversion, the key issue will be the difference between the costs of acquiring office space suitable for conversion, the costs of the conversion works and the extent to which these two costs can be recovered from residential sales revenue.

A4.2 PD schemes typically lie outside the scope of developer contributions policy as CIL is generally not payable on existing floorspace and government guidance says that planning obligations should not generally be necessary for permitted development (except for matters requiring prior approval) and that affordable housing contributions should not be sought (MHCLG, 2016: paragraph 09).

The Levy rate 'window'

A4.3 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work was undertaken to identify the range of values that the IL might take with respect to this development type.

A4.4 In this case as the development would effectively lie outside the scope of developer contributions policies the lower bound estimate equivalent to the existing system is set at zero. The upper bound, maximum rate at which the IL could be set whilst maintaining the profit motive to the developer of 15% IRR would be 9%. Figure A4.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

A4.5 In this case there is very limited scope for developer contributions regarding model A4.

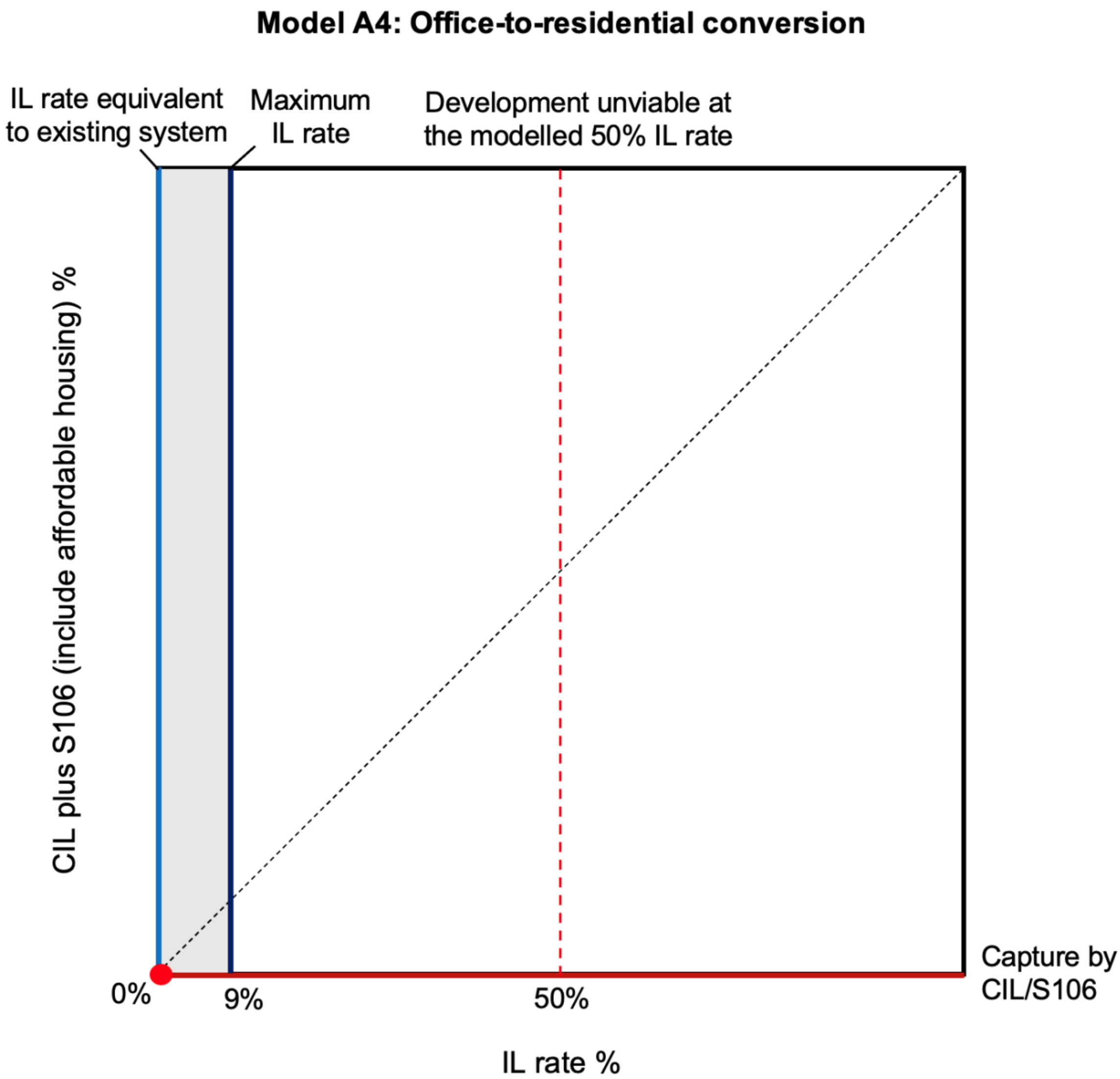
Detailed model outputs

A4.6 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. We have chosen to apply this arbitrary rate of 50% throughout all the modelling work in the interests of consistency. However, it can clearly be seen in the case of model

A4 that this hypothetical rate greatly exceeds the maximum possible value that the IL could take. Detailed model outputs are presented in Table A4.1.

A4.7 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure A4.2.

Figure A4.1: IL 'window' diagram for model A4



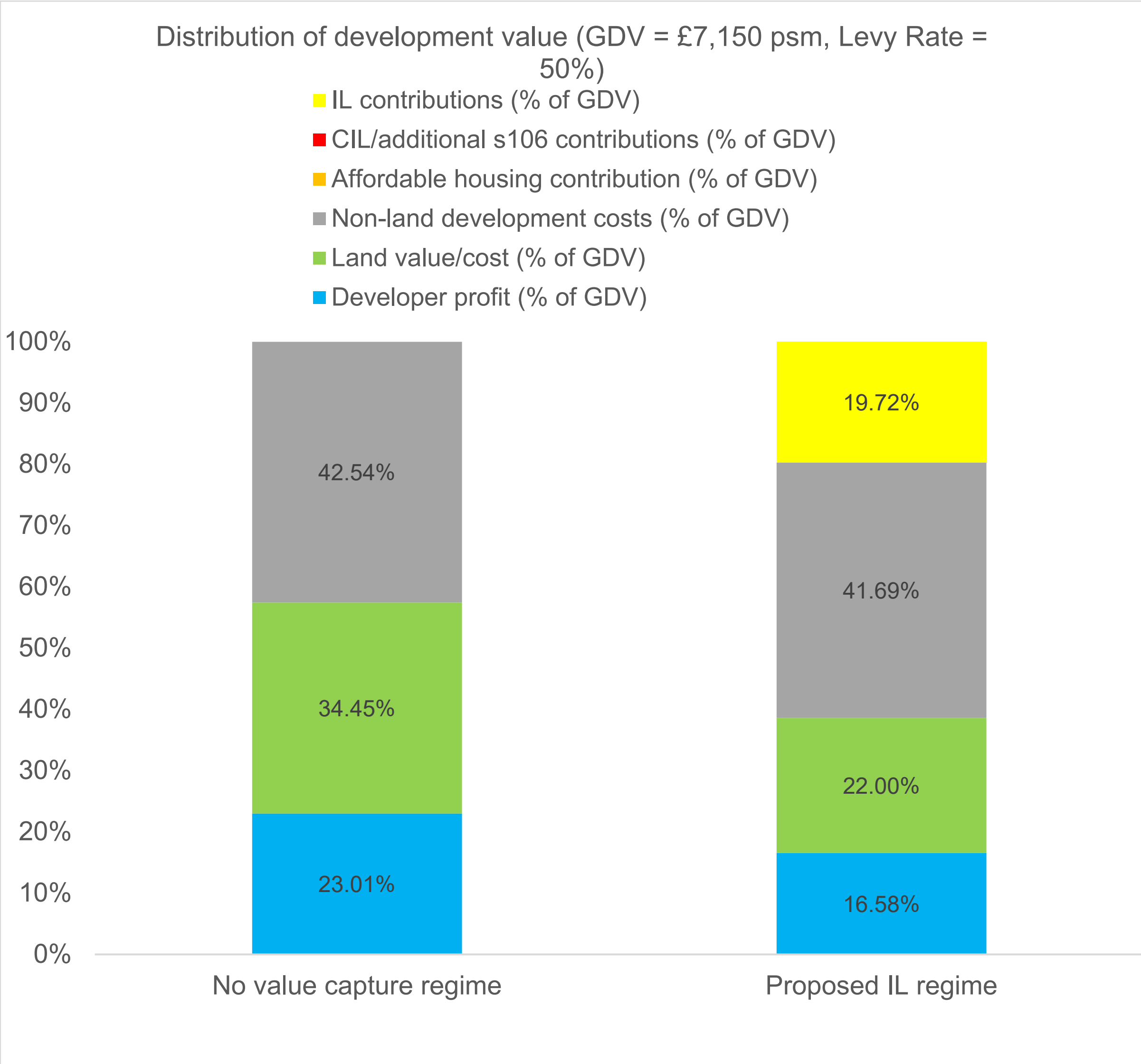
Source: Authors'

Table A4.1: Detailed model outputs for model A4

Key outputs	No LVC	CIL/S106	IL
GDV £ /m² (before AH discounts)	£7,150	£7,150	£7,150
Value of affordable housing discount (£/m² of scheme area)	£0	£0	£0
CIL/S106 (£ /m² of scheme area)	£0	£0	£0
Gross IL (£ /m² of scheme area)	£0	£0	£1,410
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£1,410
Affordable housing discounts as a % of value capture	n/a	0%	0%
Estimated residual value (£/m² of NIA)	£2,989	£2,989	£2,099
Estimated residual value (£)	£22,415,155	£22,415,155	£15,742,248
Estimated total uplift above EUV (£/m² of NIA)	£715	£715	£0
Land value uplift captured (£/m² of NIA)	£0	£0	£0
% of total uplift captured	0%	0%	0%
Total developer investment (£)	£43,268,225	£43,268,225	£36,141,560
Estimated developer profit from project (£)	£14,378,031	£14,378,031	£10,930,421
Developer profit (£/m² of scheme area)	£1,917	£1,917	£1,457
Profit margin (% of GDV)	23.96%	23.96%	18.22%
Profit margin (% of development costs)	31.52%	31.52%	22.77%
ROCE	33.23%	33.23%	30.24%
Equity multiple	1.33	1.33	1.30
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
EUV	£17,054,575		
Premium	25%		
Benchmark Land Value	£21,318,218		
Viable at 50% IL rate?	No		
IL Rate (%) (equivalent to current CIL/S106)	0%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£0		
Maximum Viable IL Rate (%)	9%		
Maximum Viable IL Rate (£/m²)	£253		

Source: Authors'

Figure A4.2: The distribution of GDV under the three scenarios



Source: Authors'

Model A4 - Interpretation

Minimum threshold

A4.8 The minimum threshold for Model A4 is £4,330.

Developer contributions

A4.9 Model A4 shows total developer contributions of 19.72% of GDV that would result under a hypothetical IL rate of 50%. However, it should be noted that this rate of IL in this example is depressing land values below BLV and so, in practice, if this levy rate were applied the development may not come forward.

A4.10 Indeed, there is generally very limited scope for developer contributions in the case of model A4. The policy-free scenario shows that the estimated value of the development site is £22.415m. This is only marginally above the Benchmark Land Value of £21.3 million. There is correspondingly, very little opportunity for the exaction of developer contributions whilst maintaining viability in this case – as implied by the very narrow IL window.

Land values

A4.11 The nominal 50% Levy Rate as modelled captures 19.72% of GDV but does so at the expense of land values which are depressed to a level of approximately £15.7 million - significantly below the Benchmark Land Value estimate of £21.3 million.

A4.12 In order to retain the BLV at the estimated level to maintain development viability the maximum possible rate for IL would be 9%. It correspondingly follows that this development type would be unviable under any IL regime of greater than 9%.

A4.13 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model A4 - Sensitivity analyses

Table A4.2: Impact on land values at varying rates of IL and minimum threshold (*source: Authors').*

Bivariate sensitivity table: impact on development site value estimate (£)

Infrastructure Levy	Minimum Threshold (£ /m²)						
	£3,250	**£3,500**	**£3,750**	**£4,000**	**£4,250**	**£4,500**	**£4,750**
10%	£20,569,331	£20,687,653	£20,805,975	£20,924,297	£21,042,619	£21,160,941	£21,279,263
20%	£18,723,507	£18,960,151	£19,196,795	£19,433,439	£19,670,083	£19,906,727	£20,143,371
30%	£16,877,682	£17,232,649	£17,587,615	£17,942,581	£18,297,547	£18,652,513	£19,007,480
40%	£15,031,858	£15,505,146	£15,978,435	£16,451,723	£16,925,011	£17,398,299	£17,871,588
50%	£13,186,034	£13,777,644	£14,369,254	£14,960,865	£15,552,475	£16,144,085	£16,735,696
60%	£11,340,209	£12,050,142	£12,760,074	£13,470,007	£14,179,939	£14,889,871	£15,599,804
70%	£9,494,385	£10,322,640	£11,150,894	£11,979,149	£12,807,403	£13,635,658	£14,463,912
80%	£7,648,561	£8,595,137	£9,541,714	£10,488,290	£11,434,867	£12,381,444	£13,328,020

Table A4.3: Impact on LVC at varying rates of IL and minimum threshold (*source: Authors').*

Bivariate sensitivity table: impact on estimated development site value uplift captured (%)

Infrastructure Levy	Minimum Threshold (£ /m²)						
£0	**£3,250**	**£3,500**	**£3,750**	**£4,000**	**£4,250**	**£4,500**	**£4,750**
10%	0%	0%	0%	0%	0%	0%	0%
20%	0%	0%	0%	0%	0%	0%	0%
30%	0%	0%	0%	0%	0%	0%	0%
40%	0%	0%	0%	0%	0%	0%	0%
50%	0%	0%	0%	0%	0%	0%	0%
60%	0%	0%	0%	0%	0%	0%	0%
70%	0%	0%	0%	0%	0%	0%	0%
80%	0%	0%	0%	0%	0%	0%	0%

Table A4.4: Impact on IL receipts at varying rates of IL and minimum threshold (*source: Authors').*

Bivariate sensitivity table: impact on IL receipt (£ /m² of scheme area)

Minimum threshold (/m²)		Levy rate (%)						
	£1,410	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
	£3,250	£780	£1,170	£1,560	£1,950	£2,340	£2,730	£3,120
	£3,500	£730	£1,095	£1,460	£1,825	£2,190	£2,555	£2,920
	£3,750	£680	£1,020	£1,360	£1,700	£2,040	£2,380	£2,720
	£4,000	£630	£945	£1,260	£1,575	£1,890	£2,205	£2,520
	£4,250	£580	£870	£1,160	£1,450	£1,740	£2,030	£2,320
	£4,500	£530	£795	£1,060	£1,325	£1,590	£1,855	£2,120
	£4,750	£480	£720	£960	£1,200	£1,440	£1,680	£1,920

Table A4.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) (*source: Authors').*

Bivariate sensitivity table: impact on development site value (£)

Base build costs (£ /m²)		Market housing (£ /m²) Levy Rate 50%						
	£15,742,248	**£5,000**	**£6,000**	**£7,000**	**£8,000**	**£9,000**	**£10,000**	**£11,000**
	£2,750	-£3,786,514	£851,711	£5,489,936	£10,128,161	£14,766,387	£19,404,612	£24,042,837
	£2,500	-£2,382,993	£2,255,233	£6,893,458	£11,531,683	£16,169,908	£20,808,133	£25,446,359
	£2,250	-£979,471	£3,658,754	£8,296,979	£12,935,205	£17,573,430	£22,211,655	£26,849,880
	£2,000	£424,051	£5,062,276	£9,700,501	£14,338,726	£18,976,951	£23,615,177	£28,253,402
	£1,750	£1,827,572	£6,465,797	£11,104,023	£15,742,248	£20,380,473	£25,018,698	£29,656,923
	£1,500	£3,231,094	£7,869,319	£12,507,544	£17,145,769	£21,783,995	£26,422,220	£31,060,445
	£1,250	£4,634,615	£9,272,841	£13,911,066	£18,549,291	£23,187,516	£27,825,741	£32,463,967

Case Study B: Urban England

B1.1 Case Study B has a median house price in the region of £280,000 per dwelling; prices have risen each of the previous five years. Median incomes are in the region of £33,000 and have increased most of the last five years. This has resulted in a minor decrease in the affordability ratio of median incomes to median house prices. In 2020 median house prices were approximately 9 times median incomes.

B1.2 For Case Study B over the five-year period 2016-2020 the scale of new housing delivered has been, on average, approximately 750 dwellings per annum. As year-on-year household growth has been averaging approximately 2,000 more households per year, recent housing delivery is about one third of what household growth in the local authority would suggest is required.

B1.3 In order to estimate new build house prices in local authority Case Study B we take land registry price paid data and apply a local authority-specific uplift to reflect the locally specific premium paid for new builds in comparison to the secondary market for new dwellings. For Case Study B this premium is 7.3% and is used to compute the values set out in Table B1.1. It should also be noted that the land registry price paid data excludes all categories of affordable housing, the sale of right-to-buy properties, transfers and actions resulting from the enactment of Compulsory Purchase Order power and court orders.

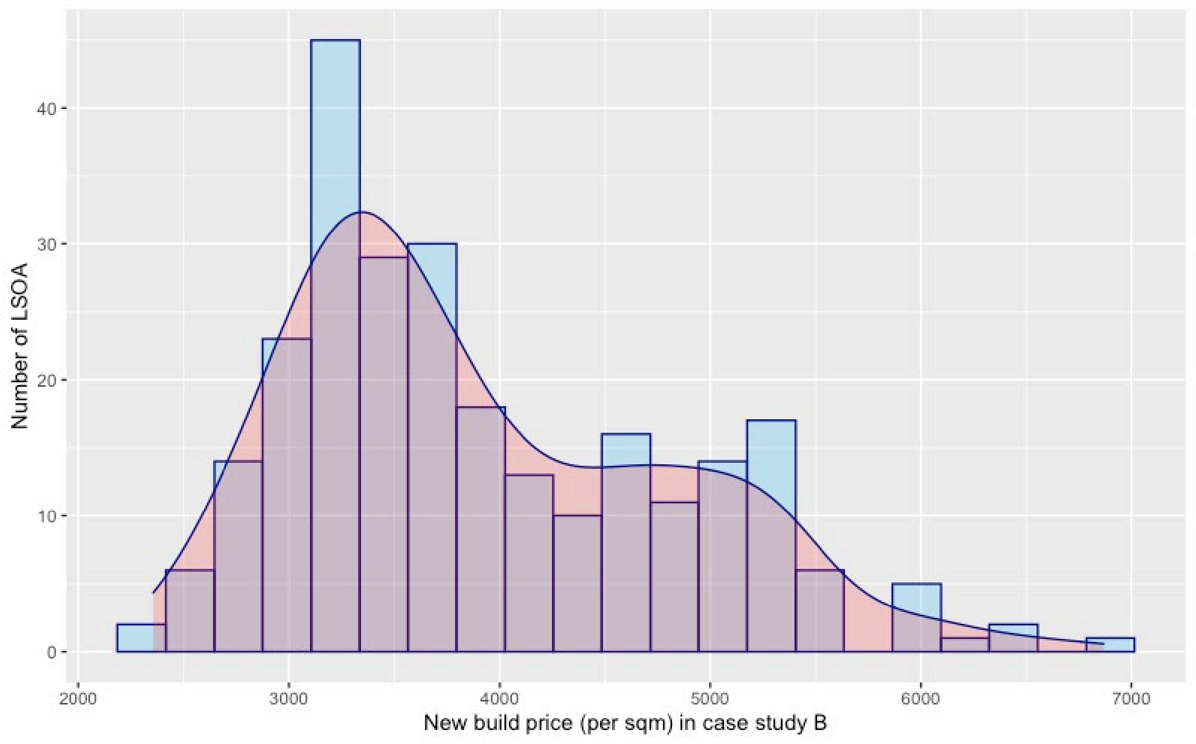
B1.4. Like Case Study A, Case Study B's housing market is heterogeneous. New build house prices vary between approximately £2,500m² and £7,000m² across LSOAs. Development values for new build house prices vary by a factor of approximately 3, with corresponding implications for how the proposed IL might function regarding development viability on some sites in lower value contexts. Modelling work will again have to encompass a variety of market contexts within this case study. Summary statistics on the variability in new build residential prices is contained in Table B1.1 and Figure B1.1.

Table B1.1: Approximate new build house prices in Case Study B (2020)

House price	Average	1st quartile	Median	3rd quartile
New Build	370,000	250,000	310,000	415,000
New Build £/m²	4,000	3,000	3,800	4,500

Source: Authors' calculations from HMLR 'price paid' data

Figure B1.1: Approximate new build house prices by LSOA in Case Study B (2020)



Source: Authors' calculations from HMLR 'price paid' data

Affordable housing, planning obligations and CIL

B1.5 Case Study B is a CIL-charging unitary authority.

B1.6 Local planning policy states that between 30% and 40% of private developments will be affordable housing. To retain anonymity, we do not provide the exact CIL charging schedule, but CIL rates vary from £0/m^2 for some uses up to the region of £150/m^2 for some residential development and higher for some retail development.

B1.7 In recent years the case study has had over 900 planning applications submitted each year, with an average of more than 600 for residential developments per annum. Of the six case studies considered as part of this study Case Study B has one of the more significant rates of higher density development on brownfield sites.

Model outcomes for Case Study B

B1.8 This local authority is a unitary authority in the Urban England local planning authority family group.

B1.9 The local authority requested four schemes to be modelled: a low-density greenfield development in a median price area of the local authority (Model B1), two higher density brownfield schemes of which one is understood to be for open market sale (Model B2) whilst the other is premised on a build-to-rent basis (Model B3) and a purpose-built student accommodation scheme, also in a brownfield location (Model B4).

B1.10 The local authority provided details of typical site densities and affordable housing requirements. For the greenfield scheme (Model B1) a 30% affordable housing contribution was stipulated. Of the 30% affordable housing, 7.5% were First Homes with the rest social rented. For the build-for-sale high density scheme, a 20% affordable housing contribution was stipulated. Affordable housing was set at 20% in model B3, a build to rent scheme. Model B4, purpose-built student accommodation, would not be liable for an affordable housing contribution. All the affordable housing was expected to be leased by the operator at concessionary rents to suitably qualified applicants.

Model B1 - Higher value greenfield residential scheme (£4,100/m²)

Model inputs

B1.11 Model B1 is a greenfield development occupying a five-hectare site (gross development area) providing a mixture of low-density apartments and single-family homes.

B1.12 The local authority provided details of appropriate densities and site sizes as well as affordable housing proportions and tenure mixes. The model takes these values as inputs and correspondingly assumes a level of 30% affordable housing of which 7.5% are modelled as First Homes with the remaining 22.5% social rented.

B1.13 CIL liability is computed at £100/m². S106 contributions are included at £25/m².

The Levy rate 'window'

B1.11 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

B1.12 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 88%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model B1 this lower bound estimate value for IL is 33%. Figure B1.2 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

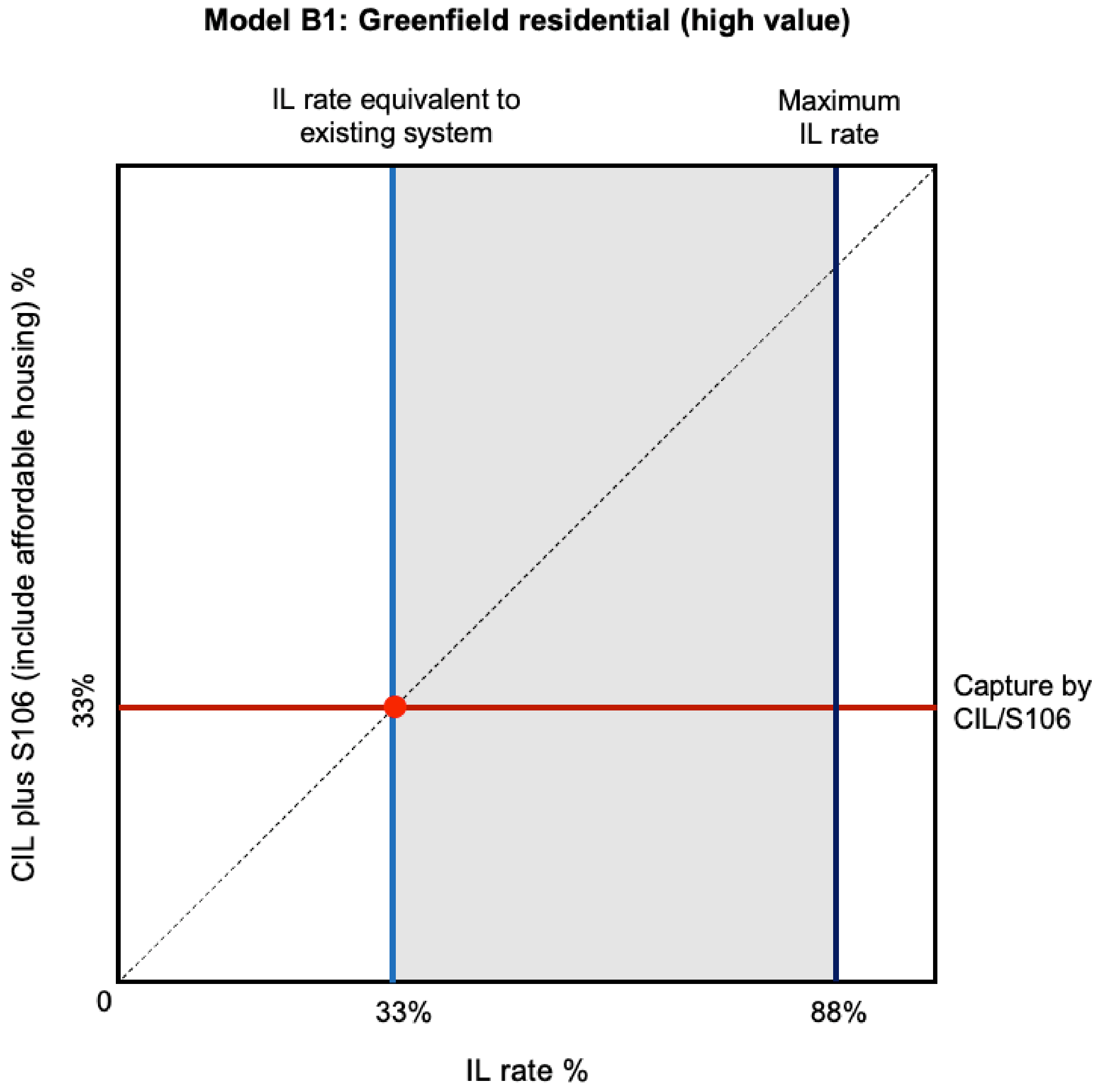
B1.13 In this case there is significant scope for developer contributions above the levels that have been achieved historically under the existing system on a modelled site of this nature, assuming the Benchmark Land Value accurately represents the cost of the land.

Detailed model outputs

B1.14 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model B1 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table B1.2.

B1.15 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure B1.3.

Figure B1.2: IL 'window' diagram for model B1



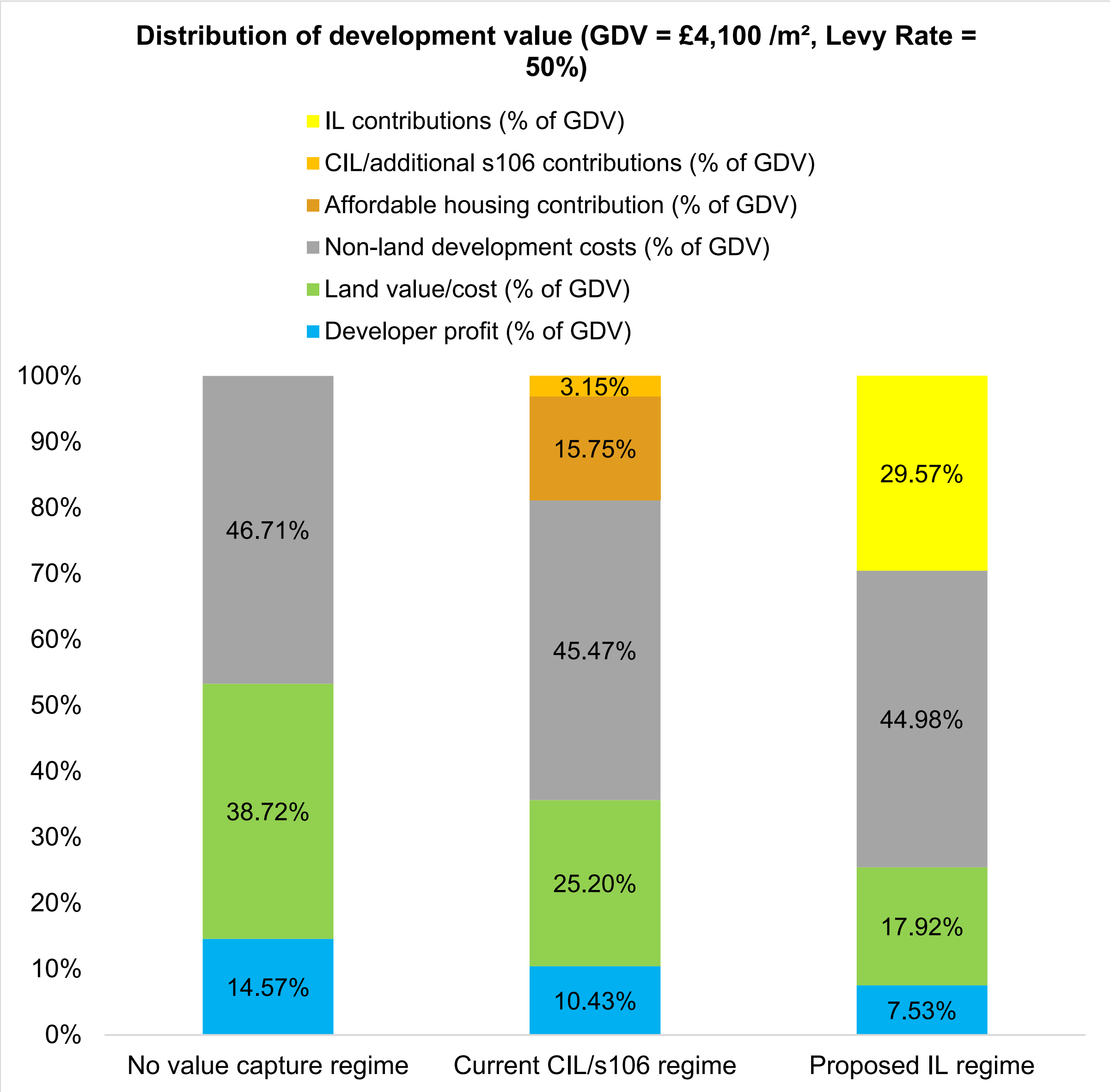
Source: Authors'

Table B1.2: Detailed model outputs for model B1

Key outputs	No LVC	CIL/S106	IL
GDV £ /m² (before AH discounts)	£4,100	£4,100	£4,100
Affordable housing discount value (£/m² of scheme area)	£0	£646	£646
CIL/S106 (£ /m² of scheme area)	£0	£129	£0
Gross IL (£ /m² of scheme area)	£0	£0	£1,212
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£567
Affordable housing discounts as a % of value capture	n/a	83%	53%
Estimated land value (£/m² of NDA)	£635	£413	£294
Estimated land value (£/ha NDA)	£6,350,172	£4,132,260	£2,939,273
Estimated land value (£/ha GDA)	£3,810,103	£2,479,356	£1,763,564
Estimated total land value uplift above EUV (£ /m² of NDA)	£632	£410	£291
Land value uplift captured (£/m² of NDA)	£0	£222	£341
% of total uplift captured	0%	35.11%	54.00%
Total developer investment (£)	£23,878,862	£17,572,160	£12,950,341
Estimated developer profit from project (£)	£7,169,995	£5,133,453	£3,704,195
Developer profit (£/m² of scheme area)	£597	£428	£309
Profit margin (% of GDV)	14.57%	12.38%	8.94%
Profit margin (% of development costs)	17.06%	14.13%	9.97%
ROCE	30.03%	29.21%	28.60%
Equity multiple	1.30	1.29	1.29
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	33%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£793		
Maximum Viable IL Rate (%)	88%		
Maximum Viable IL Rate (£/m²)	£2,129		

Source: Authors'

Figure B1.3: The distribution of GDV under the three scenarios



Source: Authors'

Model B1 - Interpretation

Minimum Threshold

B1.16 The minimum threshold for model B1 is £1,675/m².

Developer contributions

B1.17 Model B1 shows total developer contributions under the existing system of 18.9% of which 15.75% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 3.15% through CIL and non-affordable housing S106 contributions (the red shaded area).

B1.18 When modelled at the hypothetical, arbitrary rate of 50% the IL would recover 29.57% of the Gross Development Value (the green shaded area), 10.67% greater than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL, 15.75% of GDV would go to maintaining levels of affordable housing, leaving 13.82% of GDV available for infrastructure and public goods.

Land values

B1.19 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 38.72% of the total available Gross Development Value. This falls to 25.2% under the existing system and to 17.92% under the IL at the modelled rate of 50%.

B1.20 The land value reduction suggests then that around £2.22 million of the land value is being captured under the existing system, representing a reduction of c. 35% of the land value estimate with zero developer contributions.

B1.21 In the scenario with the IL set at 50%, around £3.42 million of the land value is being captured. This represents a reduction of 54% compared to the land value estimated assuming zero developer contributions.

B1.22 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model B1 - Sensitivity Analyses

Table B1.3: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on land value estimate (£ /ha GDA)

		Minimum Threshold (£ /m²)						
	£1,763,564	**£1,000**	**£1,200**	**£1,400**	**£1,600**	**£1,800**	**£2,000**	**£2,200**
Infrastructure Levy	**10%**	£3,303,240	£3,337,363	£3,371,485	£3,405,607	£3,439,730	£3,473,852	£3,507,975
	20%	£2,774,344	£2,842,588	£2,910,833	£2,979,078	£3,047,323	£3,115,568	£3,183,812
	30%	£2,245,447	£2,347,814	£2,450,181	£2,552,549	£2,654,916	£2,757,283	£2,859,650
	40%	£1,716,550	£1,853,040	£1,989,529	£2,126,019	£2,262,509	£2,398,998	£2,535,488
	50%	£1,187,653	£1,358,265	£1,528,878	£1,699,490	£1,870,102	£2,040,714	£2,211,326
	60%	£658,757	£863,491	£1,068,226	£1,272,960	£1,477,695	£1,682,429	£1,887,164
	70%	£129,860	£368,717	£607,574	£846,431	£1,085,288	£1,324,144	£1,563,001
	80%	-£399,037	-£126,057	£146,922	£419,901	£692,880	£965,860	£1,238,839

Table B1.4: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on estimated land value uplift captured (% of land value uplift)

		Minimum Threshold (£ /m²)						
	£1	**£1,000**	**£1,200**	**£1,400**	**£1,600**	**£1,800**	**£2,000**	**£2,200**
Infrastructure Levy	**10%**	13%	12%	12%	11%	10%	9%	8%
	20%	27%	26%	24%	22%	20%	18%	17%
	30%	41%	39%	36%	33%	30%	28%	25%
	40%	55%	52%	48%	44%	41%	37%	34%
	50%	69%	65%	60%	56%	51%	47%	42%
	60%	83%	78%	72%	67%	62%	56%	51%
	70%	97%	91%	84%	78%	72%	66%	59%
	80%	111%	104%	97%	89%	82%	75%	68%

Table B1.5: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on IL receipt (£ /m² of scheme area)

Minimum threshold (/m²)	Levy rate (%)						
£1,212	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
£4,000	£20	£30	£40	£50	£60	£70	£80
£3,500	£120	£180	£240	£300	£360	£420	£480
£3,000	£220	£330	£440	£550	£660	£770	£880
£2,500	£320	£480	£640	£800	£960	£1,120	£1,280
£2,000	£420	£630	£840	£1,050	£1,260	£1,470	£1,680
£1,500	£520	£780	£1,040	£1,300	£1,560	£1,820	£2,080
£1,000	£620	£930	£1,240	£1,550	£1,860	£2,170	£2,480

Table B1.6: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate sensitivity table: impact on land value (£ /ha GDA, 50% Levy rate)

Base build costs (£ /m²)	Market Housing (£ /m²)						
£1,763,564	**£3,500**	**£3,700**	**£3,900**	**£4,100**	**£4,300**	**£4,500**	**£4,700**
£1,700	£821,926	£986,789	£1,151,651	£1,316,514	£1,481,377	£1,646,239	£1,811,102
£1,600	£933,689	£1,098,551	£1,263,414	£1,428,276	£1,593,139	£1,758,002	£1,922,864
£1,500	£1,045,451	£1,210,314	£1,375,176	£1,540,039	£1,704,901	£1,869,764	£2,034,627
£1,400	£1,157,214	£1,322,076	£1,486,939	£1,651,801	£1,816,664	£1,981,527	£2,146,389
£1,300	£1,268,976	£1,433,839	£1,598,701	£1,763,564	£1,928,426	£2,093,289	£2,258,152
£1,200	£1,380,739	£1,545,601	£1,710,464	£1,875,326	£2,040,189	£2,205,052	£2,369,914
£1,100	£1,492,501	£1,657,364	£1,822,226	£1,987,089	£2,151,951	£2,316,814	£2,481,677

Model B2 - Build-for sale apartment scheme (£4,000/m²)

Model inputs

B2.1 Model B2 is a brownfield development occupying a one-hectare site providing a high-density development of 200 residential units in a higher value setting.

B2.2 As with model B1, the local authority provided details of appropriate densities and site sizes as well as affordable housing proportions and tenure mixes. The model takes these values as inputs and correspondingly assumes a level of 20% affordable housing. All the affordable housing was expected to be leased by the operator at concessionary rents to suitably qualified applicants.

B2.3 CIL liability is computed at £100/m² S106 contributions are included at £25/m².

The Levy rate 'window'

B2.4 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

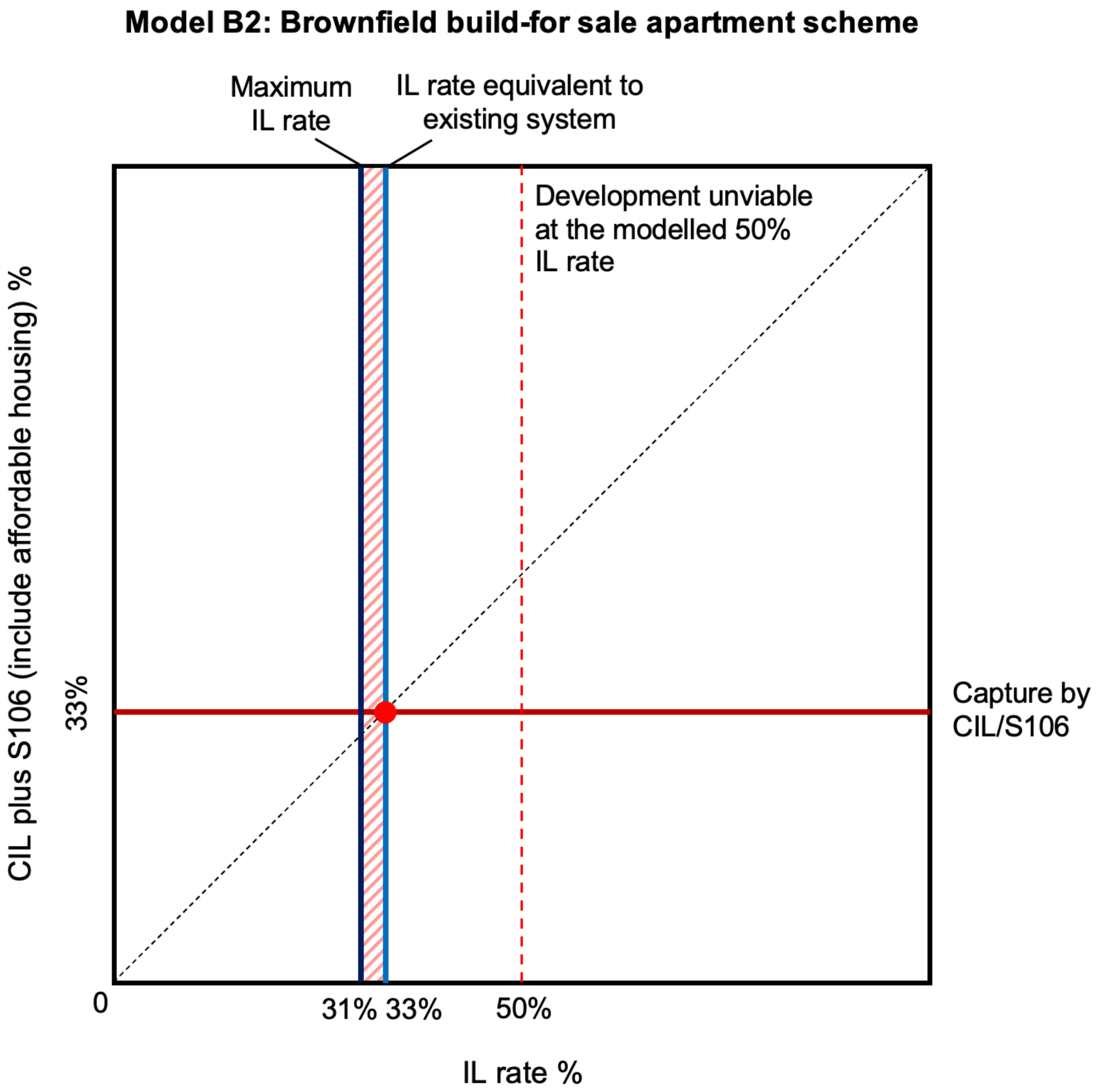
B2.5 Assuming a Benchmark Land Value of £1,250,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 31%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model B2 this lower bound estimate value for IL is 33%. The inversion of the upper and lower bounds implies that the policy-compliant implementation of the existing system is effectively unviable: it results in a greater scale of developer contributions than the maximum value the IL could take. This phenomenon is discussed further below. Figure B2.1 provides a visual representation of this 'negative window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

Detailed model outputs

B2.6 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. We have chosen to apply this arbitrary rate of 50% throughout all the modelling work in the interests of consistency. However, it can clearly be seen in the case of model B2 that this hypothetical rate exceeds the maximum possible value that the IL could take. Indeed, the lower bound rate of 33% is exceeds the maximum rate that the modelling analysis suggests might be applied (31%). The most likely explanation for this ‘negative window’ is that the policy-compliant existing system is incompatible with development viability and represents an over-statement of what might be achieved in practice. Detailed model outputs are presented in Table B2.1.

B2.7 For all scenarios the distribution of development revenues between land costs, developer’s profit, developer contributions and other non-land development costs is illustrated as Figure B2.2.

Figure B2.1: IL ‘window’ diagram for model B2



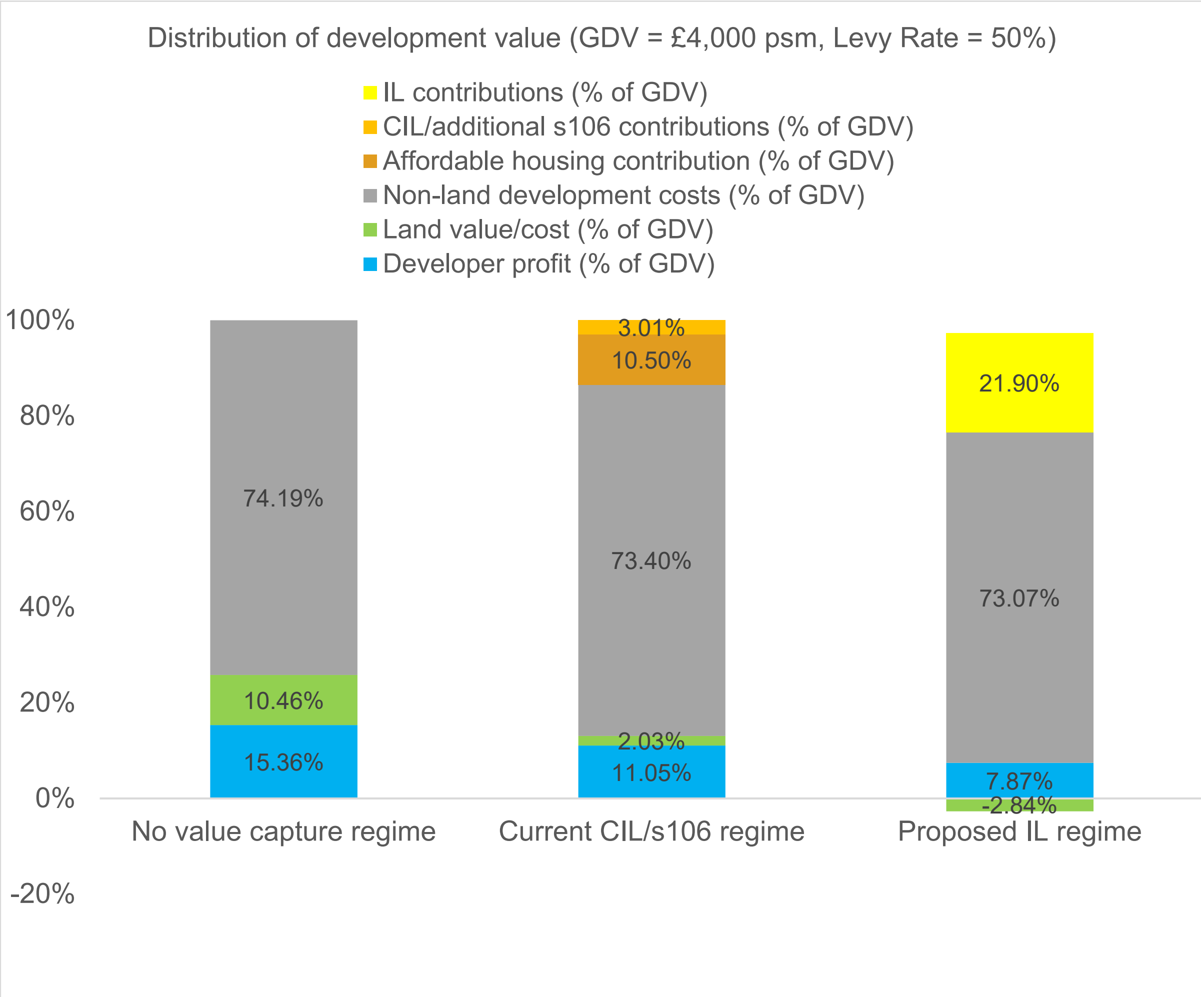
Source: Authors’

Table B2.1: Detailed model outputs for model B2

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before AH discounts)	£4,000	£4,000	£4,000
Affordable housing discount value (£/m² of scheme area)	£0	£420	£420
CIL/S106 (£/m² of scheme area)	£0	£129	£0
Gross IL (£/m² of scheme area)	£0	£0	£876
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£456
Affordable housing discounts as a % of value capture	n/a	76%	48%
Estimated land value (£/m² of NDA)	£502	£98	-£136
Estimated land value (£/ha NDA)	£5,019,515	£976,360	£1,362,372
Estimated total uplift above EUV (£/m² of NDA)	£402	£14	-£220
Land value uplift captured (£/m² of NDA)	£0	£388	£622
% of total uplift captured	0%	96.44%	154.63%
Total developer investment (£)	£37,770,589	£33,015,748	£31,075,252
Estimated developer profit from project (£)	£7,370,678	£5,304,625	£3,777,420
Developer profit (£/m² of scheme area)	£614	£442	£315
Profit margin (% of GDV)	15.36%	12.35%	8.79%
Profit margin (% of development costs)	18.14%	14.09%	9.62%
ROCE	19.51%	16.07%	12.16%
Equity multiple	1.20	1.16	1.12
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
EUV	£1,000,000		
Premium	25%		
Benchmark Land Value	£1,250,000		
Viable at 50% IL rate?	No		
IL Rate (%) (equivalent to current CIL/S106)	33%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£574		
Maximum Viable IL Rate (%)	31%		
Maximum Viable IL Rate (£/m²)	£538		

Source: Authors' calculations

Figure B2.2: The distribution of GDV under the three scenarios



Source: Authors'

Model B2 - Interpretation

Minimum threshold

B2.8 As noted for Models A2 and A3, the Minimum Thresholds for brownfield, high density projects are generally higher than greenfield sites because of higher existing use values and the increased construction costs associated with tall buildings that have communal areas. The minimum threshold for Model B2 is £2,248.

Developer contributions

B2.9 Model B2 shows total developer contributions under the existing system of 13.51% of which 10.5% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 3.01% through CIL and non-affordable housing S106 contributions (the red shaded area).

B2.10 However, as noted above the maximum rate that the IL might take in this model is greater than the rate that would be equivalent to the existing system (upper bound, 31%, lower bound, 33%). The existence of this 'negative window' implies that the scale of developer contributions required under local policy may be incompatible with development viability in this case.

B2.11 Figure B2.2 shows the outcomes that might prevail were the IL set at the arbitrarily modelled rate of 50%. If the Levy was set at this rate, exceeding the upper value our analysis would suggest it could take whilst maintaining development viability, it may be the case that development would not come forward. Stated alternatively the 21.90% of GDV that would be secured under an IL rate of 50% would come at the expense of land values which would be supressed to unviable levels.

Land values

B2.12 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 10.46% of the total available Gross Development Value. This falls to 2.03% under the existing system and to -2.84% under the IL when modelled at 50%. Under both the idealised, policy compliant existing system and the IL as modelled at 50% land values are depressed below the BLV.

B2.13 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs

Model B2 - Sensitivity analyses

Table B2.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on land value estimate

		Minimum Threshold (£/m²)						
	£1,250,000	**£2,400**	**£2,600**	**£2,800**	**£3,000**	**£3,200**	**£3,400**	**£3,600**
Infrastructure Levy	**10%**	£4,175,553	£4,330,279	£4,485,006	£4,639,732	£4,794,459	£4,949,186	£5,103,912
	20%	£2,937,739	£3,247,193	£3,556,646	£3,866,099	£4,175,553	£4,485,006	£4,794,459
	30%	£1,699,926	£2,164,106	£2,628,286	£3,092,466	£3,556,646	£4,020,826	£4,485,006
	40%	£462,113	£1,081,020	£1,699,926	£2,318,833	£2,937,739	£3,556,646	£4,175,553
	50%	-£775,700	-£2,067	£771,566	£1,545,200	£2,318,833	£3,092,466	£3,866,099
	60%	-£2,013,513	-£1,085,153	-£156,793	£771,566	£1,699,926	£2,628,286	£3,556,646
	70%	-£3,251,326	-£2,168,240	-£1,085,153	-£2,067	£1,081,020	£2,164,106	£3,247,193
	80%	-£4,489,139	-£3,251,326	-£2,013,513	-£775,700	£462,113	£1,699,926	£2,937,739

Table B2.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on estimated land value uplift captured (% of land value uplift)

		Minimum Threshold (£/m²)						
	£1	**£2,400**	**£2,600**	**£2,800**	**£3,000**	**£3,200**	**£3,400**	**£3,600**
Infrastructure Levy	**10%**	17%	13%	9%	5%	1%	-2%	-6%
	20%	48%	40%	32%	25%	17%	9%	1%
	30%	78%	67%	55%	44%	32%	21%	9%
	40%	109%	94%	78%	63%	48%	32%	17%
	50%	140%	121%	102%	82%	63%	44%	25%
	60%	171%	148%	125%	102%	78%	55%	32%
	70%	202%	175%	148%	121%	94%	67%	40%
	80%	232%	202%	171%	140%	109%	78%	48%

Table B2.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on IL receipt (£/m² of scheme area)

Minimum threshold (£/m²)		Levy rate (%)						
	£538	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
	£2,400	£320	£480	£640	£800	£960	£1,120	£1,280
	£2,600	£280	£420	£560	£700	£840	£980	£1,120
	£2,800	£240	£360	£480	£600	£720	£840	£960
	£3,000	£200	£300	£400	£500	£600	£700	£800
	£3,200	£160	£240	£320	£400	£480	£560	£640
	£3,400	£120	£180	£240	£300	£360	£420	£480
	£3,600	£80	£120	£160	£200	£240	£280	£320

Table B2.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate sensitivity table: impact on land value (£) 50% Levy rate

Base build costs (£/m²)		Market Housing (£/m²)						
	-£1,362,372	**£3,700**	**£3,800**	**£3,900**	**£4,000**	**£4,100**	**£4,200**	**£4,300**
	£1,500	£208,097	£573,243	£938,388	£1,303,534	£1,668,680	£2,033,826	£2,398,971
	£1,600	-£680,538	-£315,393	£49,753	£414,899	£780,045	£1,145,190	£1,510,336
	£1,700	-£1,569,174	-£1,204,028	-£838,882	-£473,737	-£108,591	£256,555	£621,701
	£1,800	-£2,457,809	-£2,092,663	-£1,727,518	-£1,362,372	-£997,226	-£632,080	-£266,935
	£1,900	-£3,346,444	-£2,981,299	-£2,616,153	-£2,251,007	-£1,885,861	-£1,520,716	-£1,155,570
	£2,000	-£4,235,080	-£3,869,934	-£3,504,788	-£3,139,642	-£2,774,497	-£2,409,351	-£2,044,205
	£2,100	-£5,123,715	-£4,758,569	-£4,393,423	-£4,028,278	-£3,663,132	-£3,297,986	-£2,932,841

Model B3 - Build-for-rent apartment scheme

Model inputs

B3.1 Model B3 is a brownfield development occupying a one-hectare site providing a high-density development of 200 residential units to let.

B3.2 This scheme is very similar to the previous typology, Model B2 except the 20% quota of affordable housing comprises affordable rented dwellings rather than a blend of social rented and first homes. This results in differences of costs and revenues that affect the overall modelling.

B3.3 CIL liability is computed at £100/m². S106 contributions are included at £25/m².

The Levy rate 'window'

B3.4 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

B3.5 Assuming a Benchmark Land Value of £1,250,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 0%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model B3 this lower bound estimate value for IL is 7%. The inversion of the upper and lower bounds implies that the policy-compliant implementation of the existing system is effectively unviable: it results in a greater scale of developer contributions than the maximum value the IL could take. This phenomenon is discussed further below. Figure B3.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

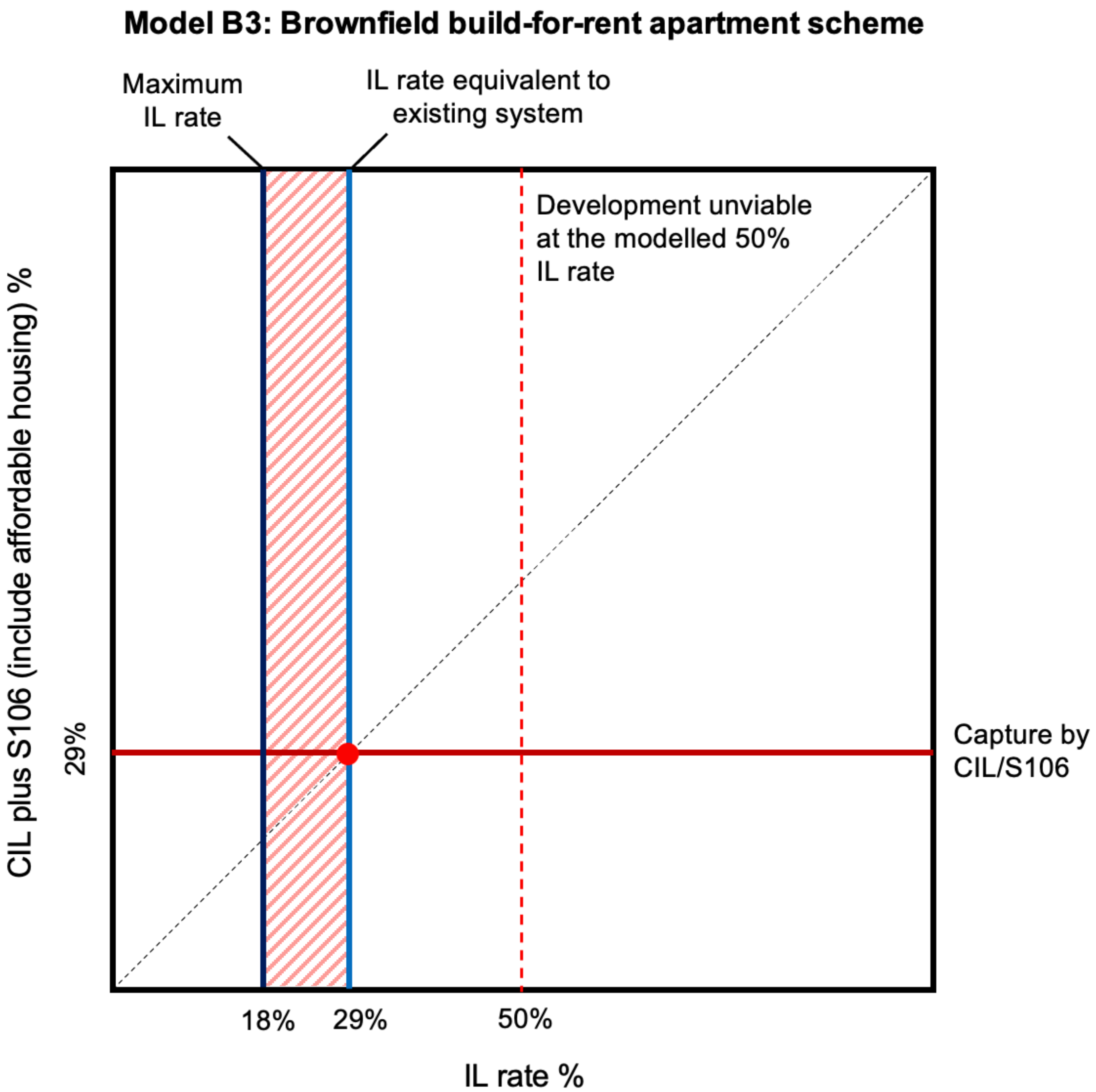
Detailed model outputs

B3.6 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. We have chosen to apply this arbitrary rate of 50% throughout all the modelling work in the interests of consistency. However, it can clearly be seen in the case of model B3 that this hypothetical rate exceeds the maximum possible value that the IL could take. Indeed, the lower bound rate of 7% exceeds the maximum rate that the modelling analysis suggests might be applied (0%).

B3.7 The most likely explanation for this ‘negative window’ is that the policy-compliant existing system is incompatible with development viability and represents an over-statement of what might be achieved in practice. Detailed model outputs are presented in Table B3.1.

B3.8 For all scenarios the distribution of development revenues between land costs, developer’s profit, developer contributions and other non-land development costs is illustrated as Figure B3.2.

Figure B3.1: IL ‘window’ diagram for model B3



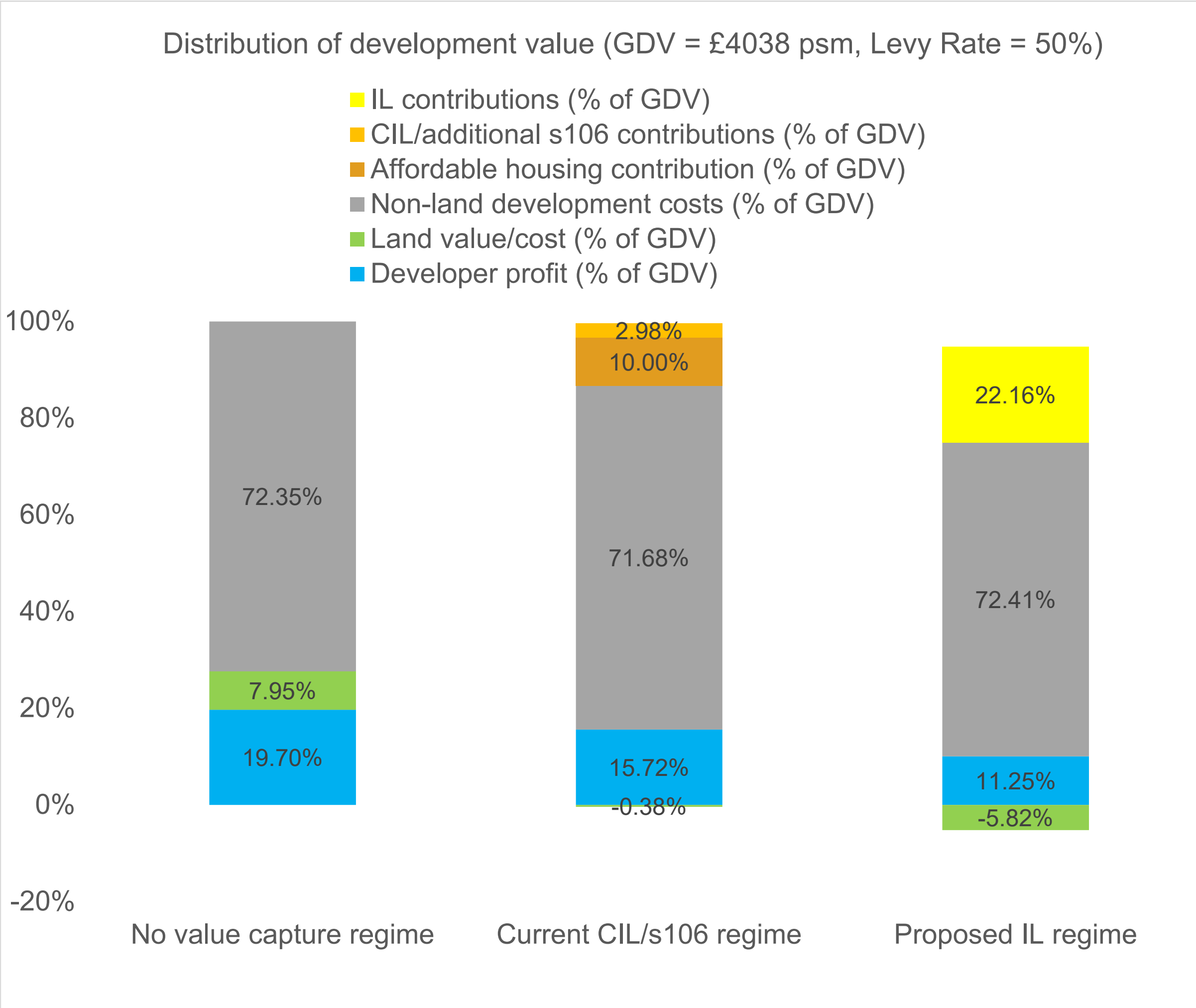
Source: Authors’

Table B3.1: Detailed model outputs for model B3

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before AH discounts)	£4,038	£4,038	£4,038
Value of affordable housing discount (£/m² of scheme area)	£0	£404	£0
CIL/S106 (£/m² of scheme area)	£0	£129	£0
Gross IL (£/m² of scheme area)	£0	£0	£895
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£0
Affordable housing discounts as a % of value capture	n/a	76%	0%
Estimated land value (£/m² of NDA)	£385	-£18.55	-£281.77
Estimated land value (£/ha NDA)	£3,853,924	-£185,542	-£2,817,739
Estimated total uplift above EUV (£/m² of NDA)	£285	-£102	-£365
Land value uplift captured (£/m² of NDA)	£0	£387	£650
% of total uplift captured	0%	135.70%	227.93%
Total developer investment (£)	£38,424,471	£35,753,140	£34,308,480
Estimated developer profit from project (£)	£9,546,034	£7,618,473	£5,449,291
Developer profit (£/m² of scheme area)	£796	£635	£454
Profit margin (% of GDV)	19.70%	17.47%	11.25%
Profit margin (% of development costs)	24.53%	21.17%	12.61%
ROCE	24.84%	21.31%	15.88%
Equity multiple	1.25	1.21	1.16
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
EUV	£1,000,000		
Premium	25%		
Benchmark Land Value	£1,250,000		
Viable at 50% IL rate?	No		
IL Rate (%) (equivalent to current CIL/106)	29%		
IL Rate (£/m²) (equivalent to current CIL/106)	£526		
Maximum Viable IL Rate (%)	18%		
Maximum Viable IL Rate (£/m²)	£325		

Source: Authors' calculations

Figure B3.2: The distribution of GDV under the three scenarios



Source: Authors'

Model B3 - Interpretation

Minimum threshold

B3.9 The minimum threshold for Model B3 is £2,248.

Developer contributions

B3.6 Model B3 shows total developer contributions under the existing system of 12.98% of which 10% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 2.98% through CIL and non-affordable housing S106 contributions (the red shaded area). It should be noted that it is likely that this local authority proposed a potential policy rather than an adopted policy with respect to affordable housing.

B3.7 As noted above the maximum rate that the IL might take in this model is greater than the rate that would be equivalent to the existing system (upper bound, 18%, lower bound, 29%). The existence of this 'negative window' implies that the scale of developer contributions potentially required under local policy may be incompatible with development viability in this case.

B3.8 Figure B3.2 shows the outcomes that might prevail were the IL set at the arbitrarily modelled rate of 50%. Were the IL to be set at this rate, exceeding the upper value our analysis would suggest it could take whilst maintaining development viability, it may be the case that development would not come forward. Stated alternatively the 22.16% of GDV that would be secured under an IL rate of 50% would come at the expense of land values which would be supressed to unviable levels.

Land values

B3.9 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 7.95% of the total available Gross Development Value. This falls to -0.38% under the existing system and to -5.82% under the IL when modelled at 50%. Under both the idealised, policy compliant existing system and the IL as modelled at 50% land values are depressed far below the BLV.

B3.10 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs

Model B3 - Sensitivity analyses

Table B3.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

		Minimum Threshold (£ /m²)						
	-£5,640,837	**£2,400**	**£2,600**	**£2,800**	**£3,000**	**£3,200**	**£3,400**	**£3,600**
Infrastructure Levy	**10%**	-£425,762	-£283,079	-£140,396	£2,287	£144,969	£287,652	£430,335
	20%	-£1,594,279	-£1,308,913	-£1,023,548	-£738,182	-£452,816	-£167,450	£117,916
	30%	-£2,762,796	-£2,334,748	-£1,906,699	-£1,478,650	-£1,050,601	-£622,552	-£194,504
	40%	-£3,931,313	-£3,360,582	-£2,789,850	-£2,219,118	-£1,648,387	-£1,077,655	-£506,923
	50%	-£5,099,830	-£4,386,416	-£3,673,001	-£2,959,587	-£2,246,172	-£1,532,757	-£819,343
	60%	-£6,268,348	-£5,412,250	-£4,556,152	-£3,700,055	-£2,843,957	-£1,987,860	-£1,131,762
	70%	-£7,436,865	-£6,438,084	-£5,439,304	-£4,440,523	-£3,441,743	-£2,442,962	-£1,444,182
	80%	-£8,605,382	-£7,463,918	-£6,322,455	-£5,180,991	-£4,039,528	-£2,898,065	-£1,756,601

Table B3.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on estimated land value uplift captured (% of land value uplift)

		Minimum Threshold (£ /m²)						
	£3	**£2,400**	**£2,600**	**£2,800**	**£3,000**	**£3,200**	**£3,400**	**£3,600**
Infrastructure Levy	**10%**	144%	139%	134%	129%	124%	119%	114%
	20%	185%	175%	165%	155%	145%	135%	125%
	30%	226%	211%	196%	181%	166%	151%	136%
	40%	267%	247%	227%	207%	187%	167%	147%
	50%	308%	283%	258%	233%	208%	183%	158%
	60%	349%	319%	289%	259%	229%	199%	169%
	70%	390%	355%	320%	285%	250%	215%	180%
	80%	431%	391%	351%	311%	271%	231%	191%

Table B3.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on IL receipt (£ /m² of scheme area)

		Levy rate (%)						
	£895	20%	30%	40%	50%	60%	70%	80%
Minimum threshold (/m²)	£2,400	£328	£491	£655	£819	£983	£1,147	£1,310
	£2,600	£288	£431	£575	£719	£863	£1,007	£1,150
	£2,800	£248	£371	£495	£619	£743	£867	£990
	£3,000	£208	£311	£415	£519	£623	£727	£830
	£3,200	£168	£251	£335	£419	£503	£587	£670
	£3,400	£128	£191	£255	£319	£383	£447	£510
	£3,600	£88	£131	£175	£219	£263	£307	£350

Table B3.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate sensitivity table: impact on land value estimate

		Market Value (£ /m²)						
	-£5,640,837	**£3,400**	**£3,600**	**£3,800**	**£4,000**	**£4,200**	**£4,400**	**£4,600**
Base Build Costs (£ /m²)	**£1,000**	£12,782	£557,831	£1,102,880	£1,647,928	£2,192,977	£2,738,026	£3,283,075
	£1,200	-£1,835,245	-£1,290,197	-£745,148	-£200,099	£344,950	£889,998	£1,435,047
	£1,400	-£3,683,273	-£3,138,224	-£2,593,175	-£2,048,127	-£1,503,078	-£958,029	-£412,980
	£1,600	-£5,531,300	-£4,986,252	-£4,441,203	-£3,896,154	-£3,351,105	-£2,806,056	-£2,261,008
	£1,800	-£7,379,328	-£6,834,279	-£6,289,230	-£5,744,181	-£5,199,133	-£4,654,084	-£4,109,035
	£2,000	-£9,227,355	-£8,682,306	-£8,137,258	-£7,592,209	-£7,047,160	-£6,502,111	-£5,957,063
	£2,200	-£11,075,383	-£10,530,334	-£9,985,285	-£9,440,236	-£8,895,188	-£8,350,139	-£7,805,090
	£2,400	-£12,923,410	-£12,378,361	-£11,833,313	-£11,288,264	-£10,743,215	-£10,198,166	-£9,653,117

Model B4 - Purpose-built student accommodation

Model inputs

B4.1 Model B4 is a purpose-built student accommodation scheme occupying a 0.25 hectare site accommodating 300 rooms.

B4.2 As student accommodation has been one of the fastest expanding institutional real estate sectors over the last decade, it is not surprising that it has tended to attract relatively high CIL rates. Since there is no capacity for 'in-kind' affordable housing contributions, local authorities have tended to levy CIL rates that are high compared to other residential uses.

B4.3 It is assumed that each room has a Market Value of £100,000. This equates to a similar Market Value of £4,000/m². for the build-for-rent and build-for sale apartment schemes. In practice, there can be a high degree of heterogeneity in the values of student accommodation with variations in quality of accommodation, quality of location and operating model (contractual relations, if any, with local universities). With values ranging from £60,000 to £140,000 per room nationally, an average of £100,000 per room was used for modelling purposes as this was consistent with viability studies in comparable contexts to the case study in question. However, it should be acknowledged that it is an important and highly variable input.

B4.4 CIL liability is computed at £149/m². S106 contributions are included at £25/m².

The Levy rate 'window'

B4.5 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

B4.6 Assuming a Benchmark Land Value of £1,250,000/ha (£312,500 for the 0.25 ha site under consideration) it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 67%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model B4 this lower bound estimate value for IL is 9%. Figure B4.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

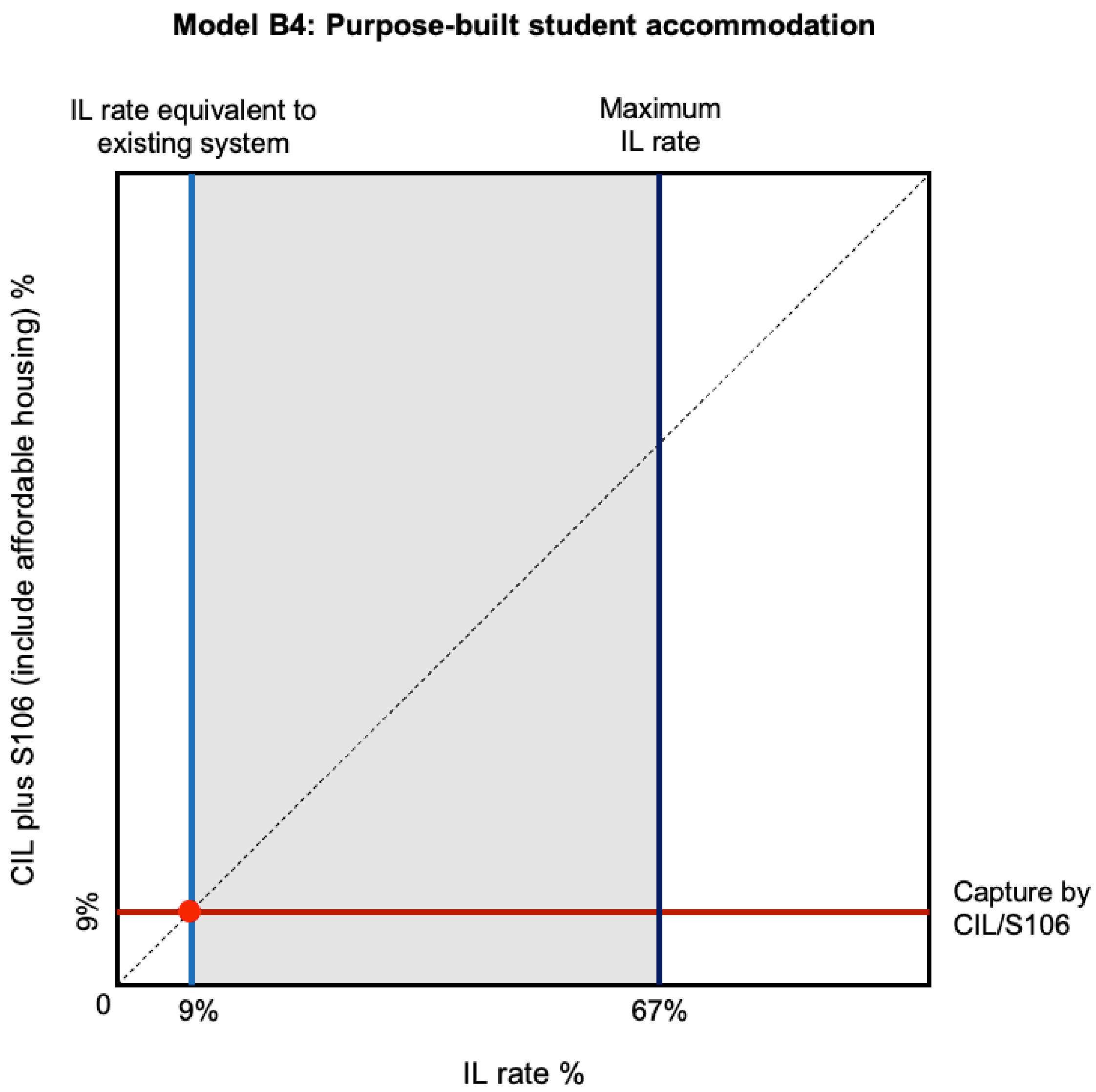
B4.7 In the case of Model B4 there is significant scope for developer contributions.

Detailed model outputs

B4.8 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model B4 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table B4.1.

B4.9 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure B4.2.

Figure B4.1: IL 'window' diagram for model B4



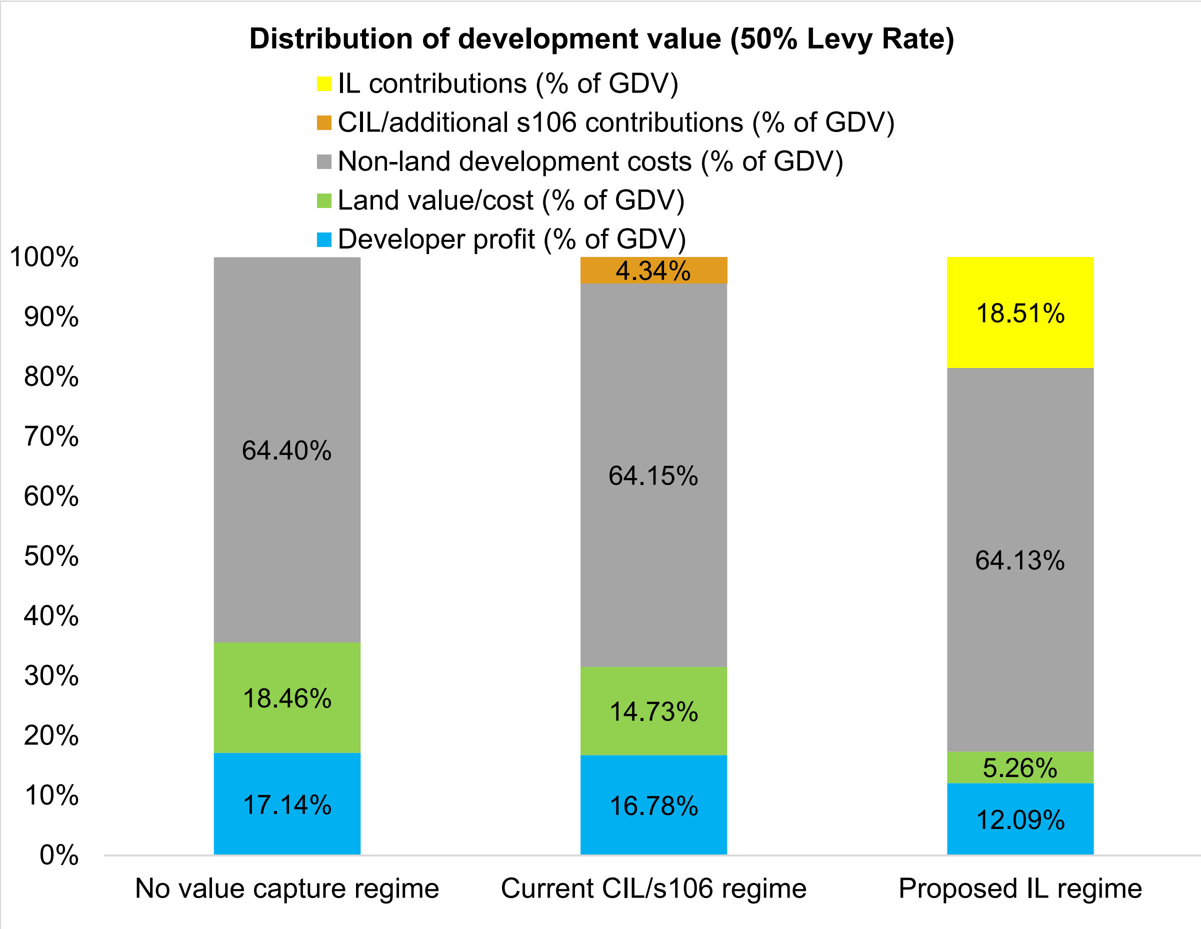
Source: Authors'

Table B4.1: Detailed model outputs for model B4

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before AH discounts)	£4,000	£4,000	£4,000
CIL/S106 (£/m² of scheme area)	£0	£174	£0
IL (£ /m² of scheme area)	£0	£0	£740
Estimated land value (£/m² of NDA)	£2,214.63	£1,887.75	£632
Estimated land value (£/ha NDA)	£22,146,332	£18,877,527	£6,317,993
Estimated total uplift above EUV (£/m² of NDA)	£2,115	£1,788	£532
Land value uplift captured (£/m² of NDA)	£0	£327	£1,583
% of total uplift captured	0%	15.46%	74.85%
Total developer investment (£)	£24,557,819	£24,666,580	£20,519,152
Estimated developer profit from project (£)	£5,142,181	£5,033,420	£3,628,348
Developer profit (£/m² of scheme area)	£686	£671	£484
Profit margin (% of GDV)	17.14%	16.78%	12.09%
Profit margin (% of development costs)	20.69%	20.16%	13.81%
ROCE	20.94%	20.41%	17.68%
Equity multiple	1.21	1.20	1.18
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
EUV	£250,000		
Premium	25%		
Benchmark Land Value	£312,500		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	9%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£128		
Maximum Viable IL Rate (%)	67%		
Maximum Viable IL Rate (£/m²)	£987		

Source: Authors'

Figure B4.2: The distribution of GDV under the three scenarios



Source: Authors’

Model B4 - Interpretation

Minimum threshold

B4.10 The minimum threshold for Model B4 is £2,519/m²

Developer contributions

B4.11 Model B4 shows total developer contributions under the existing system of 4.34%. As this is a purpose-built student accommodation scheme there is no affordable housing contribution, so all developer contributions are exacted through CIL and non-affordable housing S106 contributions and are represented by the blue shaded area of the middle bar.

B4.12 The proposed IL set at a nominal rate of 50% recovers 18.51% of the Gross Development Value (the green shaded area), 14.17%% greater than the current system.

Land values

B4.13 Land values are diminished as result of the imposition of any system of developer contributions. In the policy-free scenario land values account of 18.46% of the total available Gross Development Value. This falls to 14.73% under the existing system and to 5.26% under the proposed IL.

B4.14 The difference in the land values indicates that 15.5% of the land value uplift is captured through S106/CIL.

B4.15 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model B4 - Sensitivity analyses

Table B4.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on land value estimate (£ /ha NDA)

		Minimum Threshold (£ /m²)						
	£6,317,993	**£1,900**	**£2,100**	**£2,300**	**£2,500**	**£2,700**	**£2,900**	**£3,100**
Infrastructure Levy	**10%**	£17,195,485	£17,605,699	£18,015,912	£18,426,126	£18,836,339	£19,246,552	£19,656,766
	20%	£12,888,245	£13,708,671	£14,529,098	£15,349,525	£16,169,952	£16,990,379	£17,810,806
	30%	£8,581,004	£9,811,644	£11,042,284	£12,272,924	£13,503,565	£14,734,205	£15,964,845
	40%	£4,273,763	£5,914,617	£7,555,470	£9,196,324	£10,837,178	£12,478,031	£14,118,885
	50%	-£33,478	£2,017,589	£4,068,656	£6,119,723	£8,170,790	£10,221,857	£12,272,924
	60%	-£4,340,719	-£1,879,438	£581,842	£3,043,123	£5,504,403	£7,965,684	£10,426,964
	70%	-£8,647,960	-£5,776,466	-£2,904,972	-£33,478	£2,838,016	£5,709,510	£8,581,004
	80%	-£12,955,200	-£9,673,493	-£6,391,786	-£3,110,079	£171,629	£3,453,336	£6,735,043

Source: Authors'

Table B4.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on estimated land value uplift captured (% of land value uplift)

		Minimum Threshold (£ /m²)						
	£1	**£1,900**	**£2,100**	**£2,300**	**£2,500**	**£2,700**	**£2,900**	**£3,100**
Infrastructure Levy	**10%**	23%	21%	20%	18%	16%	14%	12%
	20%	44%	40%	36%	32%	28%	24%	21%
	30%	64%	58%	53%	47%	41%	35%	29%
	40%	85%	77%	69%	61%	53%	46%	38%
	50%	105%	95%	85%	76%	66%	56%	47%
	60%	125%	114%	102%	90%	79%	67%	55%
	70%	146%	132%	118%	105%	91%	78%	64%
	80%	166%	150%	135%	119%	104%	88%	73%

Table B4.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on IL receipt (£ /m² of scheme area)

Minimum threshold (/m²)	£740	Levy rate (%) 20%	30%	40%	50%	60%	70%	80%
	£3,100	£180	£270	£360	£450	£540	£630	£720
	£2,900	£220	£330	£440	£550	£660	£770	£880
	£2,700	£260	£390	£520	£650	£780	£910	£1,040
	£2,500	£300	£450	£600	£750	£900	£1,050	£1,200
	£2,300	£340	£510	£680	£850	£1,020	£1,190	£1,360
	£2,100	£380	£570	£760	£950	£1,140	£1,330	£1,520
	£1,900	£420	£630	£840	£1,050	£1,260	£1,470	£1,680

Table B4.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate sensitivity table: impact on land value estimate (£ /ha) Levy rate (50%)

Base Build Costs (£ /m²)	£6,317,993	Total revenue (£) **£24,000,000**	**£26,000,000**	**£28,000,000**	**£30,000,000**	**£32,000,000**	**£34,000,000**	**£36,000,000**
	£1,300	£2,562,772	£7,977,589	£13,392,406	£18,807,223	£24,222,040	£29,636,857	£35,051,674
	£1,500	-£559,536	£4,855,281	£10,270,099	£15,684,916	£21,099,733	£26,514,550	£31,929,367
	£1,700	-£3,681,843	£1,732,974	£7,147,791	£12,562,608	£17,977,425	£23,392,242	£28,807,059
	£1,900	-£6,804,151	-£1,389,334	£4,025,484	£9,440,301	£14,855,118	£20,269,935	£25,684,752
	£2,100	-£9,926,458	-£4,511,641	£903,176	£6,317,993	£11,732,810	£17,147,627	£22,562,444
	£2,300	-£13,048,766	-£7,633,949	-£2,219,131	£3,195,686	£8,610,503	£14,025,320	£19,440,137
	£2,500	-£16,171,073	-£10,756,256	-£5,341,439	£73,378	£5,488,195	£10,903,012	£16,317,829
	£2,700	-£19,293,381	-£13,878,564	-£8,463,747	-£3,048,929	£2,365,888	£7,780,705	£13,195,522

Case Study C: Commuter belt

C1.1 Case Study C has a median house price in the region of £310,000 per dwelling and has seen a steady increase in house prices in recent years. Median incomes in the authority are in the region of £31,000 and have been increasing in recent years. The affordability ratio of median incomes to median house prices has therefore remained relatively constant over the last few years at around 10.

C1.2 For Case Study C over the five-year period 2016-2020, the scale of new housing delivered has been, on average, approximately 1,500 dwellings per annum. As year-on-year household growth has been averaging approximately 2,000 more households per year, recent housing delivery is about 75% of what household growth in the local authority would suggest is required.

C1.3 In order to estimate new build house prices in local authority Case Study C we take land registry price paid data and apply a local authority-specific uplift to reflect the locally specific premium paid for new builds in comparison to the secondary market for new dwellings. For Case Study C this premium is 4.7% and is used to compute the values set out in Table C1.1. It should also be noted that the land registry price paid data excludes all categories of affordable housing, the sale of right-to-buy properties, transfers and actions resulting from the enactment of Compulsory Purchase Order powers and court orders.

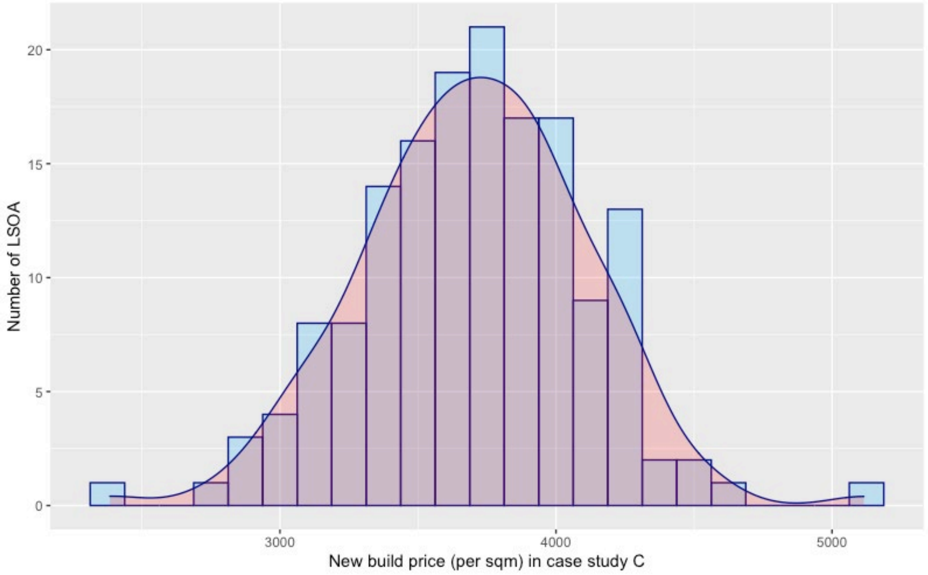
C1.4 Like the previous two case studies, C is a heterogeneous new build housing market. New build house prices vary between approximately £2,400m² and £5,100m² across LSOAs that comprise the authority. Development values for new build house prices vary by a factor of approximately 2. As such, variation is less than in the previous two case studies but continues to have implications for the IL. Summary statistics on the variability in new build residential prices is contained in Table C1.1 and Figure C1.1.

Table C1.1: Approximate new build house prices in Case Study C (2020)

House price	Average	1st quartile	Median	3rd quartile
New Build	360,000	260,000	330,000	420,000
New Build £/m²	3,700	3,200	3,600	4,100

Source: Authors' calculations from HMLR 'price paid' data

Figure C1.1: Approximate new build house prices by LSOA in Case Study C (2020)



Source: Authors' calculations from HMLR 'price paid' data

Affordable housing, planning obligations and CIL

C1.5 Case Study C is not a CIL-charging authority.

C1.6 Local planning policy states that 30% of private developments will be affordable housing (routinely provided as affordable rent and intermediate rent).

C1.7 In recent years the case study has had over 600 planning applications submitted each year, with an average of around 400 for residential developments per annum.

Model outputs for Case Study C

C1.8 Case study C is a member of the Commuter Belt family of local authorities.

C1.9 The local authority requested four residential schemes to be modelled: three low density greenfield schemes in respectively higher (Model C1), median (Model C2) and lower (Model C3) value settings and a strategic urban extension (Model C4).

C1.10 The local authority specified a uniform affordable housing policy for all modelled sites requiring 30% of housing to be affordable of which 14.4% would be social rented, 7.5% would be affordable rent and 8.1% should be an intermediate tenure.

Model C1 - Residential development (upper quartile house price = £4,200/m²)

Model inputs

C1.11 Model C1 is a greenfield development occupying a five-hectare site (gross development area) in a higher value setting providing a mixture of low-density apartments and single-family homes.

C1.12 The local authority provided details of appropriate densities and site sizes as well as affordable housing proportions and tenure mixes. The model takes these values as inputs and correspondingly assumes a level of 30% of housing to be affordable of which 14.4% would be social rented, 7.5% would be affordable rent and 8.1% should be an intermediate tenure.

C1.13 Developer contributions are modelled in this local authority based on S106 alone as it is a non CIL charging authority. Drawing upon data from the local authority it was estimated that, in addition to any affordable housing contributions, additional S106 contributions amounting to £13,500 per dwelling would be incurred.

The Levy rate 'window'

C1.14 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

C1.15 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 89%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model C1 this lower bound estimate value for IL is 32%. Figure C1.2 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

C1.16 In this case there is significant scope for developer contributions above the levels that have been achieved historically under the existing system on a modelled site of this nature, assuming the Benchmark Land Value accurately represents the cost of the land.

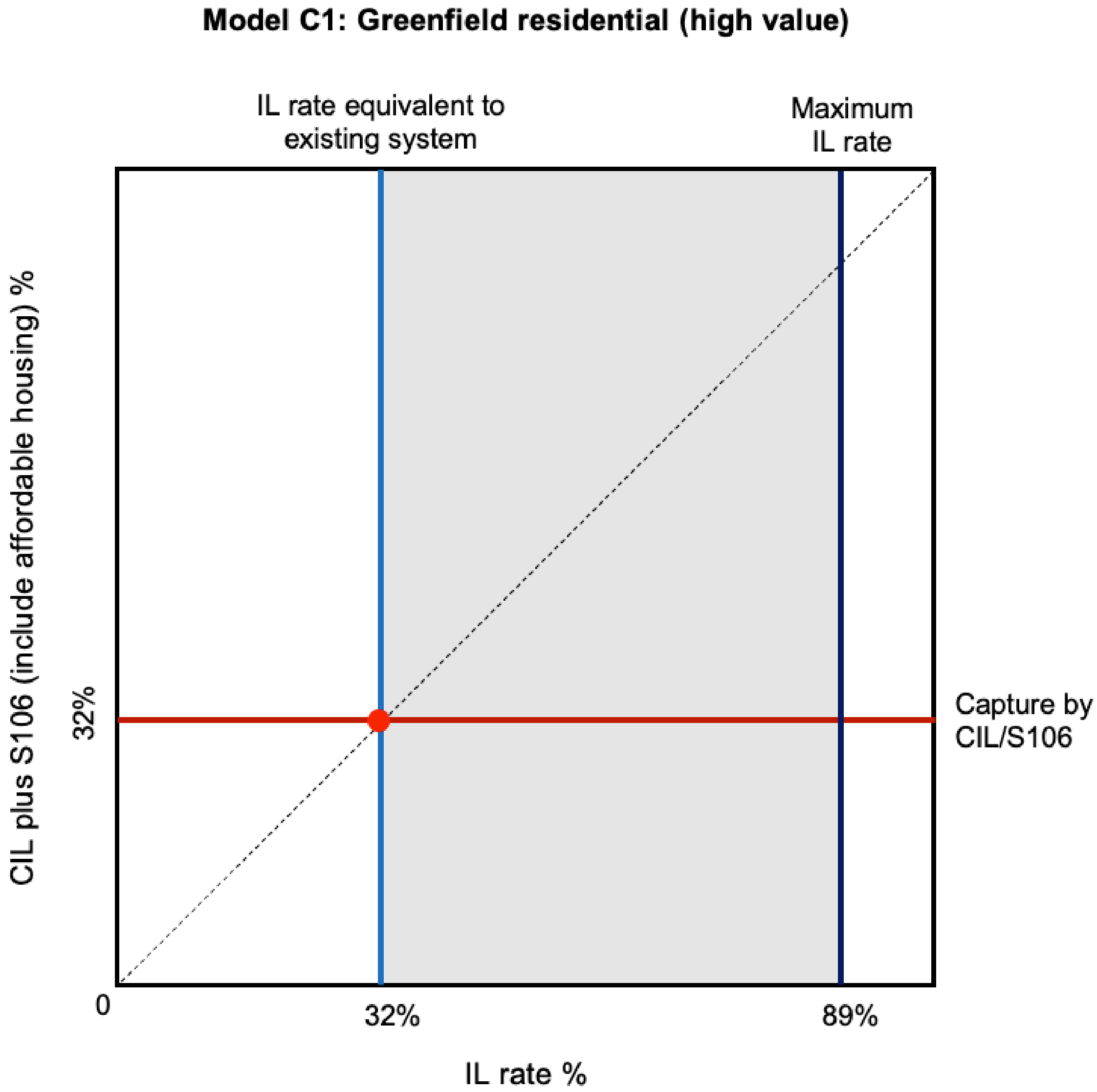
Detailed model outputs

C1.14 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed

Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model C1 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table C1.2.

C1.15 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure C1.3.

Figure C1.2: IL 'window' diagram for model C1



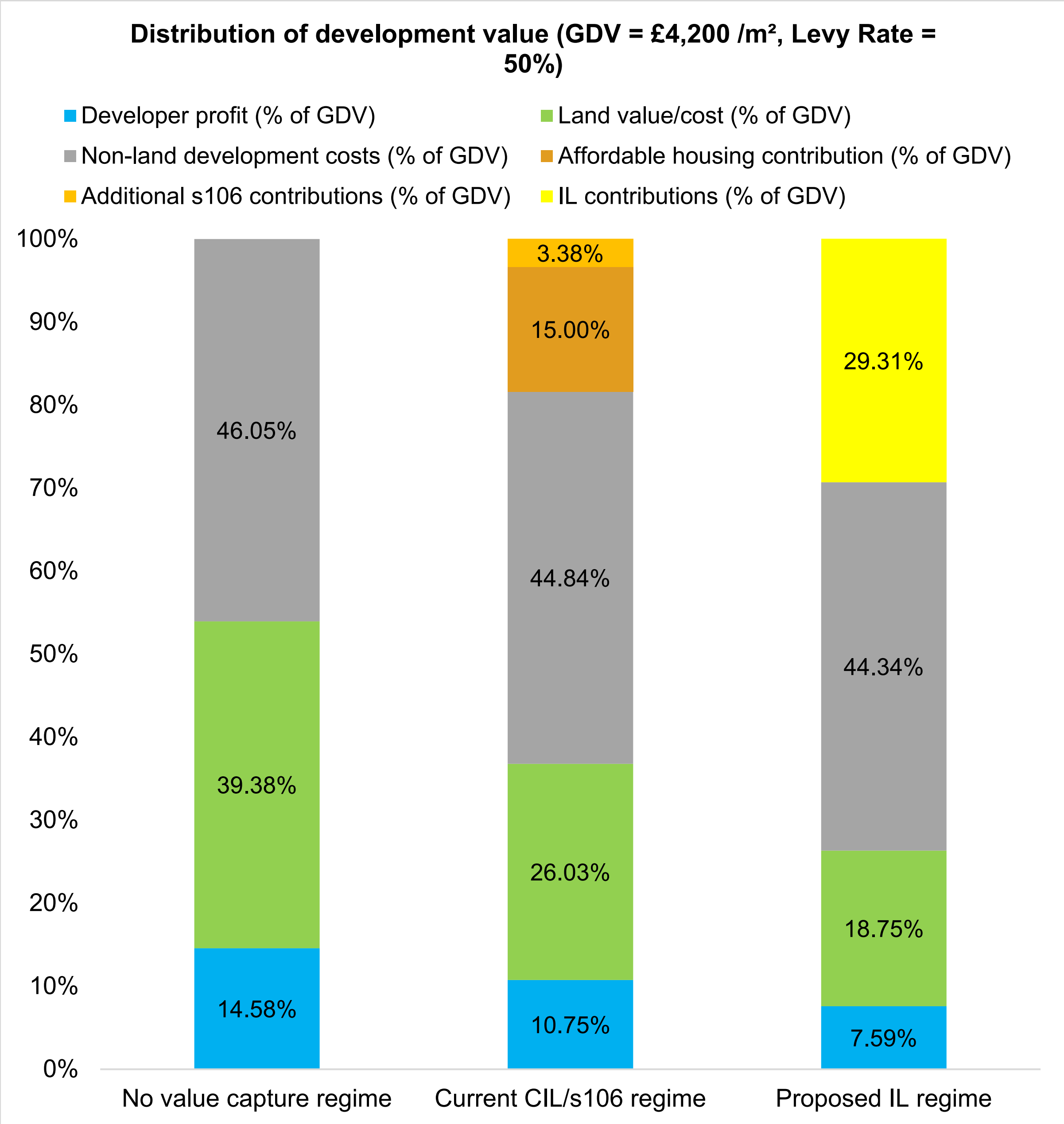
Source: Authors'

Table C1.2: Detailed model outputs for model C1

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before AH discounts)	£4,200	£4,200	£4,200
Value of affordable housing discount (£/m² of scheme area)	£0	£630	£630
CIL/S106 (£/m² of scheme area)	£0	£142	£0
Gross IL (£/m² of scheme area)	£0	£0	£1,231
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£601
Affordable housing discounts as a % of value capture	n/a	82%	51%
Estimated land value (£/m² of NDA)	£498	£329	£237
Estimated land value (£/ha NDA)	£4,975,387	£3,288,447	£2,369,341
Estimated land value (£/ha GDA)	£2,985,232	£1,973,068	£1,421,604
Estimated total land value uplift above EUV (£/m² of NDA)	£494	£326	£234
Land value uplift captured (£/m² of NDA)	£0	£169	£261
% of total uplift captured	0%	34.13%	52.73%
Total developer investment (£)	£18,214,415	£14,091,010	£9,864,643
Estimated developer profit from project (£)	£5,524,782	£4,076,158	£2,876,789
Developer profit (£/m² of scheme area)	£612	£452	£319
Profit margin (% of GDV)	14.58%	12.65%	8.93%
Profit margin (% of development costs)	17.06%	14.48%	9.97%
ROCE	30.33%	28.93%	29.16%
Equity multiple	1.30	1.29	1.29
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	32%		
IL Rate (£ /m²) (equivalent to current CIL/S106)	£793		
Maximum Viable IL Rate (%)	89%		
Maximum Viable IL Rate (£/m²)	£2,183		

Source: Authors’

Figure C1.3: The distribution of GDV under the three scenarios



Source: Authors’

Model C1 - Interpretation

Minimum threshold

C1.16 The minimum threshold for model C1 is £1,738/m².

Developer contributions

C1.17 Model C1 shows total developer contributions under the existing system of 18.38% of which 15% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 3.38% through CIL and non-affordable housing S016 contributions (the red shaded area).

C1.18 If set at the modelled rate of 50% the IL would recover 29.31% of the Gross Development Value (the green shaded area), 10.93% greater than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL, 15% of GDV would go to maintaining levels of affordable housing, leaving 14.31% of GDV available for infrastructure and public goods.

Land values

C1.19 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 39.38% of the total available Gross Development Value. This falls to 26.03% under the existing system and to 18.75% under the IL as modelled at 50%.

C1.20 The land value reduction suggests then that around £1.69million of the land value is being captured by the existing system. This represents 34% of the land value estimate in the policy-free scenario.

C1.21 Under the proposed IL the land value reduction suggests that around £2.6 million of the land value is being captured. This represents a reduction of c.53% compared to the land value estimated assuming zero developer contributions

C1.22 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model C1 - Sensitivity analyses

Table C1.3: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on land value estimate (£ /ha GDA)

		Minimum Threshold (£ /m²)						
		£1,100	**£1,300**	**£1,500**	**£1,700**	**£1,900**	**£2,100**	**£2,300**
Infrastructure Levy	**10%**	£2,603,625	£2,629,288	£2,654,951	£2,680,613	£2,706,276	£2,731,939	£2,757,602
	20%	£2,205,850	£2,257,176	£2,308,502	£2,359,828	£2,411,154	£2,462,479	£2,513,805
	30%	£1,808,076	£1,885,065	£1,962,053	£2,039,042	£2,116,031	£2,193,019	£2,270,008
	40%	£1,410,302	£1,512,953	£1,615,605	£1,718,256	£1,820,908	£1,923,560	£2,026,211
	50%	£1,012,527	£1,140,842	£1,269,156	£1,397,471	£1,525,785	£1,654,100	£1,782,414
	60%	£614,753	£768,730	£922,708	£1,076,685	£1,230,662	£1,384,640	£1,538,617
	70%	£216,978	£396,619	£576,259	£755,899	£935,540	£1,115,180	£1,294,820
	80%	-£180,796	£24,507	£229,810	£435,114	£640,417	£845,720	£1,051,023

Source: Authors'

Table C1.4: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on estimated land value uplift captured (%)

		Minimum Threshold (£ /m²)						
		£1,100	**£1,300**	**£1,500**	**£1,700**	**£1,900**	**£2,100**	**£2,300**
Infrastructure Levy	**10%**	13%	12%	11%	10%	9%	9%	8%
	20%	26%	25%	23%	21%	19%	18%	16%
	30%	40%	37%	35%	32%	29%	27%	24%
	40%	53%	50%	46%	43%	39%	36%	32%
	50%	67%	62%	58%	54%	49%	45%	41%
	60%	80%	75%	70%	64%	59%	54%	49%
	70%	93%	87%	81%	75%	69%	63%	57%
	80%	107%	100%	93%	86%	79%	72%	65%

Source: Authors'

Table C1.5: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on IL receipt (£ /m² of scheme area)

		Levy rate (%)						
Minimum threshold	£1,231	20%	30%	40%	50%	60%	70%	80%
	£1,100	£620	£930	£1,240	£1,550	£1,860	£2,170	£2,480
	£1,300	£580	£870	£1,160	£1,450	£1,740	£2,030	£2,320
	£1,500	£540	£810	£1,080	£1,350	£1,620	£1,890	£2,160
	£1,700	£500	£750	£1,000	£1,250	£1,500	£1,750	£2,000
	£1,900	£460	£690	£920	£1,150	£1,380	£1,610	£1,840
	£2,100	£420	£630	£840	£1,050	£1,260	£1,470	£1,680
	£2,300	£380	£570	£760	£950	£1,140	£1,330	£1,520

Source: Authors'

Table C1.6: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate sensitivity table: impact on land value estimate (£ /ha GDA) 50% Levy rate

		Market housing values (£ /m²)						
		£3,600	**£3,800**	**£4,000**	**£4,200**	**£4,400**	**£4,600**	**£4,800**
Base build costs (£ /m²)	**£1,200**	£1,175,831	£1,299,783	£1,423,735	£1,547,687	£1,671,638	£1,795,590	£1,919,542
	£1,250	£1,133,803	£1,257,755	£1,381,707	£1,505,659	£1,629,611	£1,753,563	£1,877,515
	£1,300	£1,091,776	£1,215,728	£1,339,680	£1,463,632	£1,587,584	£1,711,536	£1,835,487
	£1,350	£1,049,749	£1,173,701	£1,297,653	£1,421,604	£1,545,556	£1,669,508	£1,793,460
	£1,400	£1,007,721	£1,131,673	£1,255,625	£1,379,577	£1,503,529	£1,627,481	£1,751,433
	£1,450	£965,694	£1,089,646	£1,213,598	£1,337,550	£1,461,502	£1,585,454	£1,709,405
	£1,500	£923,667	£1,047,619	£1,171,570	£1,295,522	£1,419,474	£1,543,426	£1,667,378
	£1,550	£881,639	£1,005,591	£1,129,543	£1,253,495	£1,377,447	£1,501,399	£1,625,351

Source: Authors'

Model C2: Residential development (median house price = £3,600/m²)

Model inputs

C2.1 Model C2 is a greenfield development on a five-hectare site (gross development area) in a median value setting providing a mixture of low-density apartments and single-family homes.

C2.2 The local authority provided details of appropriate densities and site sizes as well as affordable housing proportions and tenure mixes. The model takes these values as inputs and correspondingly assumes a level of 30% of housing to be affordable of which 14.4% would be social rented, 7.5% would be affordable rent and 8.1% should be an intermediate tenure.

C2.3 As with Model C1 developer contributions are estimated to comprise these affordable housing contributions plus additional S106 contributions amounting to £13,500 per dwelling.

The Levy rate 'window'

C2.4 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

C2.5 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 86%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model C2 this lower bound estimate value for IL is 39%. Figure C2.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

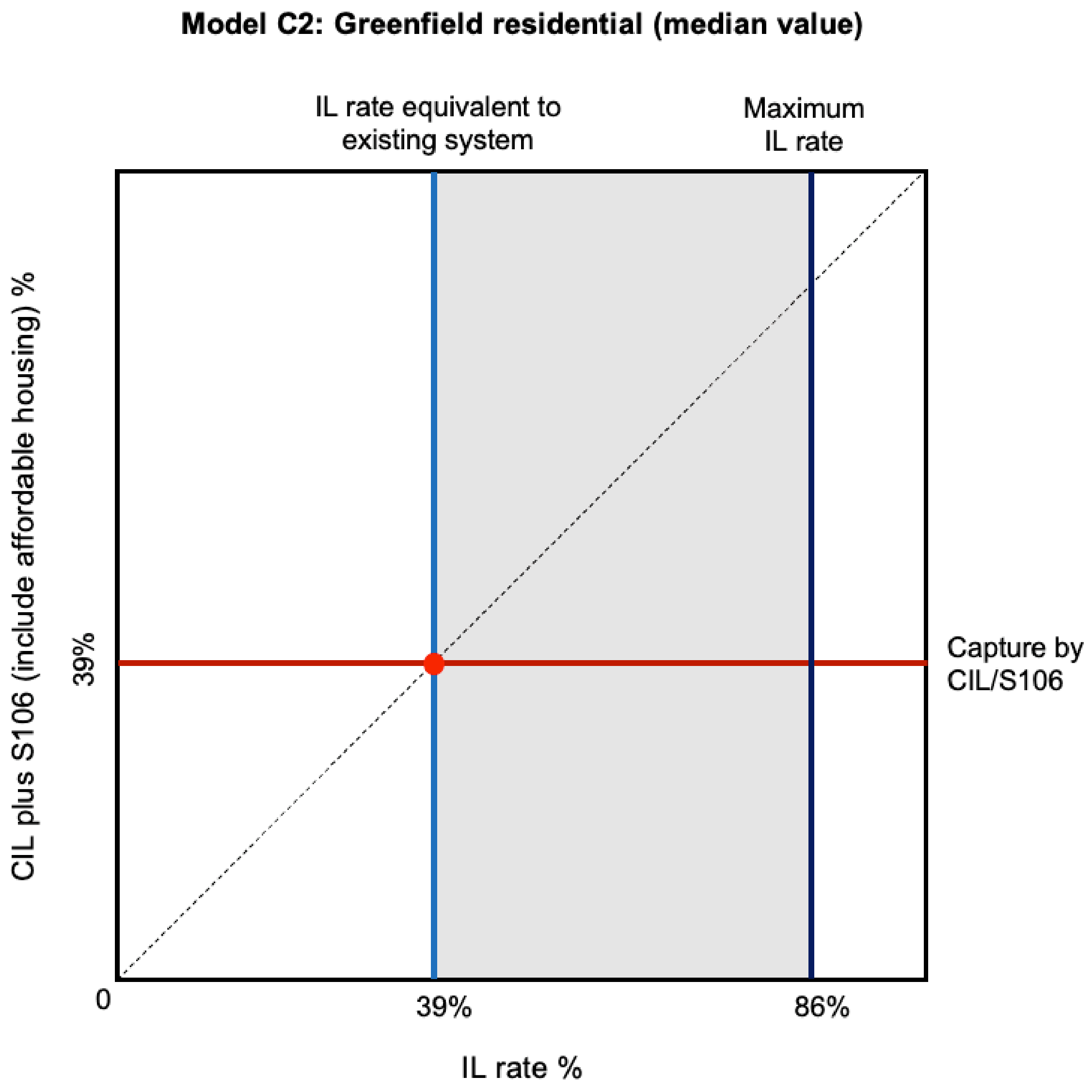
C2.6 In this case there is significant scope for developer contributions - although somewhat less than in the higher value setting represented by Model C1. It is worth noting that the principal explanatory features in accounting for the differential performance of the IL are development values.

Detailed model outputs

C2.7 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model C2 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table C2.1.

C2.8 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure C2.2.

Figure C2.1: IL 'window' diagram for model C2



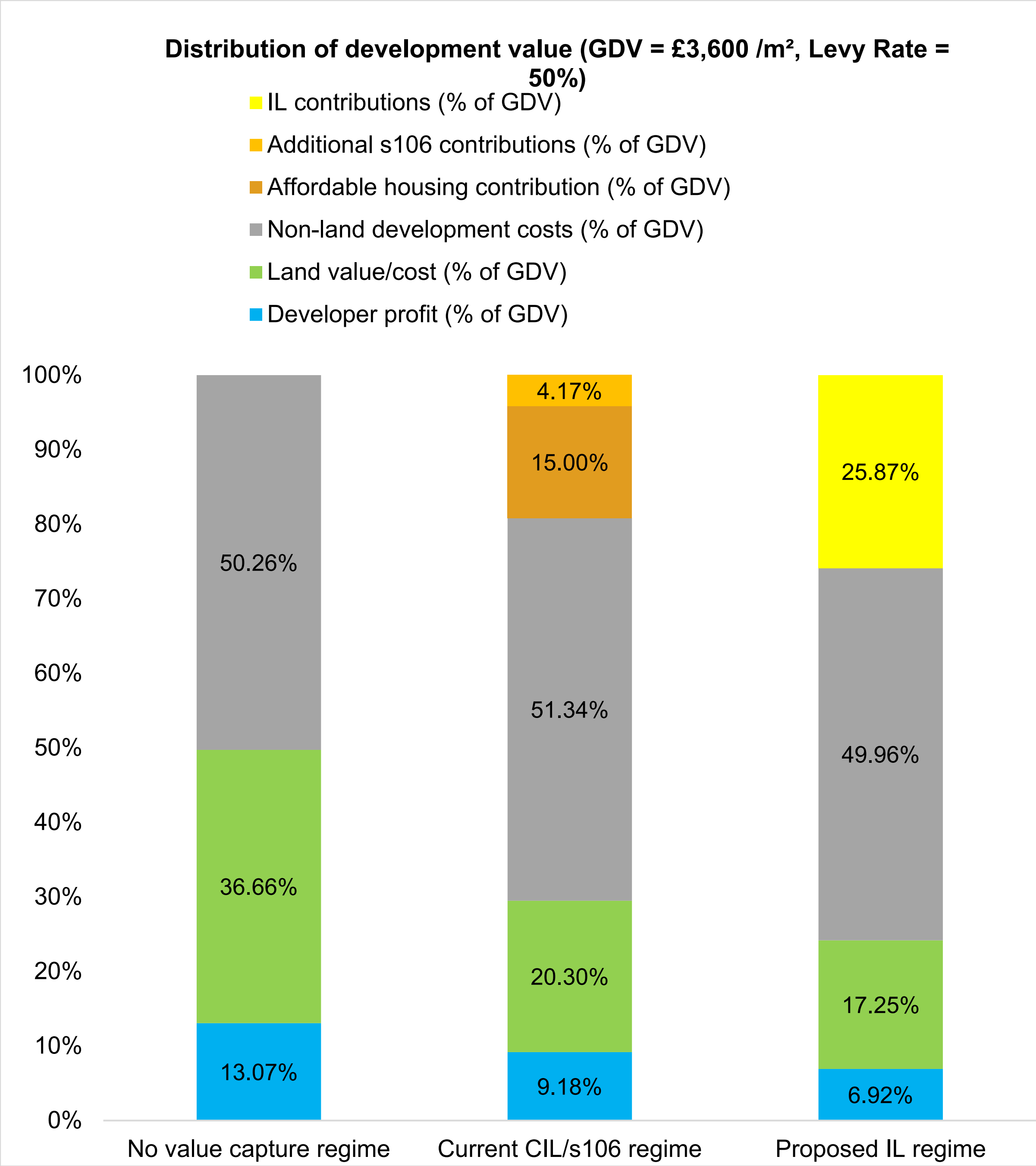
Source: Authors'

Table C2.1: Detailed model outputs for model C2

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before AH discounts)	£3,600	£3,600	£3,600
Value of affordable housing discount (£/m² of scheme area)	£0	£540	£540
CIL/S106 (£/m² of scheme area)	£0	£150	£0
Gross IL (£/m² of scheme area)	£0	£0	£931
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£391
Affordable housing discounts as a % of value capture	n/a	78%	58%
Estimated land value (£ m² of NDA)	£371	£219	£174
Estimated land value (£/ha NDA)	£3,707,606	£2,192,844	£1,744,729
Estimated land value (£/ha GDA)	£2,224,564	£1,315,706	£1,046,837
Estimated total uplift above EUV (£/m² of NDA)	£367	£216	£171
Land value uplift captured (£/m² of NDA)	£0	£151	£196
% of total uplift captured	0%	41.23%	53.42%
Total developer investment (£)	£14,146,148	£10,642,849	£7,857,089
Estimated developer profit from project (£)	£4,235,295	£2,975,799	£2,240,823
Developer profit (£/m² of scheme area)	£471	£331	£249
Profit margin (% of GDV)	13.07%	10.81%	8.14%
Profit margin (% of development costs)	15.04%	12.11%	8.98%
ROCE	29.94%	27.96%	28.52%
Equity multiple	1.30	1.28	1.29
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	39%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£714		
Maximum Viable IL Rate (%)	86%		
Maximum Viable IL Rate (£/m²)	£1,593		

Source: Authors’

Figure C2.2: The distribution of GDV under the three scenarios



Source: Authors'

Model C2 - Interpretation

Minimum threshold

C2.9 The minimum threshold for model C2 is £1,738

Developer contributions

C2.10 Model C2 shows total developer contributions under the existing system of 19.17% of which 15% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 4.17% through CIL and non-affordable housing S106 contributions (the red shaded area).

C2.11 Modelled at the hypothetical rate of 50%, the IL would recover 25.87% of the Gross Development Value (the green shaded area), 6.7% greater than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL, 15% of GDV would go to maintaining levels of affordable housing, leaving 10.87% of GDV available for infrastructure and public goods.

Land values

C2.12 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 36.66% of the total available Gross Development Value. This falls to 20.30% under the existing system and to 17.25% under the IL as modelled at 50%.

C2.13 The land value reduction suggests that around £1.5 million of the land value is being captured under the existing system, in total representing a reduction of c.41% of the land value estimate with zero developer contributions.

C2.14 The modelling suggests that, if set at 50% the IL would result in approximately £2 million of the total land value being captured. This represents a reduction of c.53% compared to the land value estimated assuming zero developer contributions.

C2.15 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Sensitivity analyses

Table C2.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on land value estimate (£ /ha GDA)

		Minimum Threshold (£ /m²)						
	£1,046,837	**£1,500**	**£1,600**	**£1,700**	**£1,800**	**£1,900**	**£2,000**	**£2,100**
Infrastructure Levy	**10%**	£1,969,669	£1,982,465	£1,995,261	£2,008,057	£2,020,853	£2,033,649	£2,046,444
	20%	£1,700,956	£1,726,547	£1,752,139	£1,777,731	£1,803,323	£1,828,915	£1,854,506
	30%	£1,432,242	£1,470,630	£1,509,017	£1,547,405	£1,585,793	£1,624,181	£1,662,568
	40%	£1,163,528	£1,214,712	£1,265,896	£1,317,079	£1,368,263	£1,419,447	£1,470,630
	50%	£894,815	£958,794	£1,022,774	£1,086,753	£1,150,733	£1,214,713	£1,278,692
	60%	£626,101	£702,877	£779,652	£856,428	£933,203	£1,009,978	£1,086,754
	70%	£357,388	£446,959	£536,530	£626,102	£715,673	£805,244	£894,816
	80%	£88,674	£191,041	£293,409	£395,776	£498,143	£600,510	£702,878

Table C2.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on estimated land value uplift captured (%)

		Minimum Threshold (£ /m²)						
	£1	**£1,500**	**£1,600**	**£1,700**	**£1,800**	**£1,900**	**£2,000**	**£2,100**
Infrastructure Levy	**10%**	12%	11%	10%	10%	9%	9%	8%
	20%	24%	23%	21%	20%	19%	18%	17%
	30%	36%	34%	32%	31%	29%	27%	25%
	40%	48%	46%	43%	41%	39%	37%	34%
	50%	60%	57%	55%	52%	49%	46%	43%
	60%	73%	69%	66%	62%	59%	55%	52%
	70%	85%	81%	77%	73%	68%	64%	60%
	80%	97%	92%	88%	83%	78%	74%	69%

Table C2.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on IL receipt (£ /m² of scheme area)

		Levy rate (%)						
Minimum threshold (/m²)	£931	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**
	£1,500	£210	£420	£630	£840	£1,050	£1,260	£1,470
	£1,600	£200	£400	£600	£800	£1,000	£1,200	£1,400
	£1,700	£190	£380	£570	£760	£950	£1,140	£1,330
	£1,800	£180	£360	£540	£720	£900	£1,080	£1,260
	£1,900	£170	£340	£510	£680	£850	£1,020	£1,190
	£2,000	£160	£320	£480	£640	£800	£960	£1,120
	£2,100	£150	£300	£450	£600	£750	£900	£1,050

Table C2.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate sensitivity table: impact on land value estimate (£ /ha GDA) Levy rate = 50%

		Market housing values (£ /m²)						
Base build costs (£ /m²)	£1,046,837	**£3,000**	**£3,200**	**£3,400**	**£3,600**	**£3,800**	**£4,000**	**£4,200**
	£1,200	£801,745	£925,353	£1,048,962	£1,172,570	£1,296,179	£1,419,787	£1,543,396
	£1,250	£759,834	£883,442	£1,007,051	£1,130,659	£1,254,268	£1,377,876	£1,501,485
	£1,300	£717,923	£841,531	£965,140	£1,088,748	£1,212,357	£1,335,965	£1,459,574
	£1,350	£676,012	£799,620	£923,229	£1,046,837	£1,170,446	£1,294,054	£1,417,663
	£1,400	£634,101	£757,709	£881,318	£1,004,926	£1,128,535	£1,252,143	£1,375,752
	£1,450	£592,190	£715,798	£839,407	£963,015	£1,086,624	£1,210,233	£1,333,841
	£1,500	£550,279	£673,887	£797,496	£921,105	£1,044,713	£1,168,322	£1,291,930
	£1,550	£508,368	£631,977	£755,585	£879,194	£1,002,802	£1,126,411	£1,250,019

Model C3 - Residential development (lower quartile house price = £3,200/m²)

Model inputs

C3.1 Model C3 is a greenfield development on a five-hectare site (gross development area) in a lower value setting providing a mixture of low-density apartments and single-family homes.

C3.2 The local authority provided details of appropriate densities and site sizes as well as affordable housing proportions and tenure mixes. The model takes these values as inputs and correspondingly assumes a level of 30% of housing to be affordable of which 14.4% would be social rented, 7.5% would be affordable rent and 8.1% should be an intermediate tenure.

C3.3 As with Models C1 and C2 developer contributions are estimated to comprise these affordable housing contributions plus additional S106 contributions amounting to £13,500 per dwelling.

The Levy rate 'window'

C3.4 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

C3.5 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 82%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model C3 this lower bound estimate value for IL is 43%. Figure C3.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

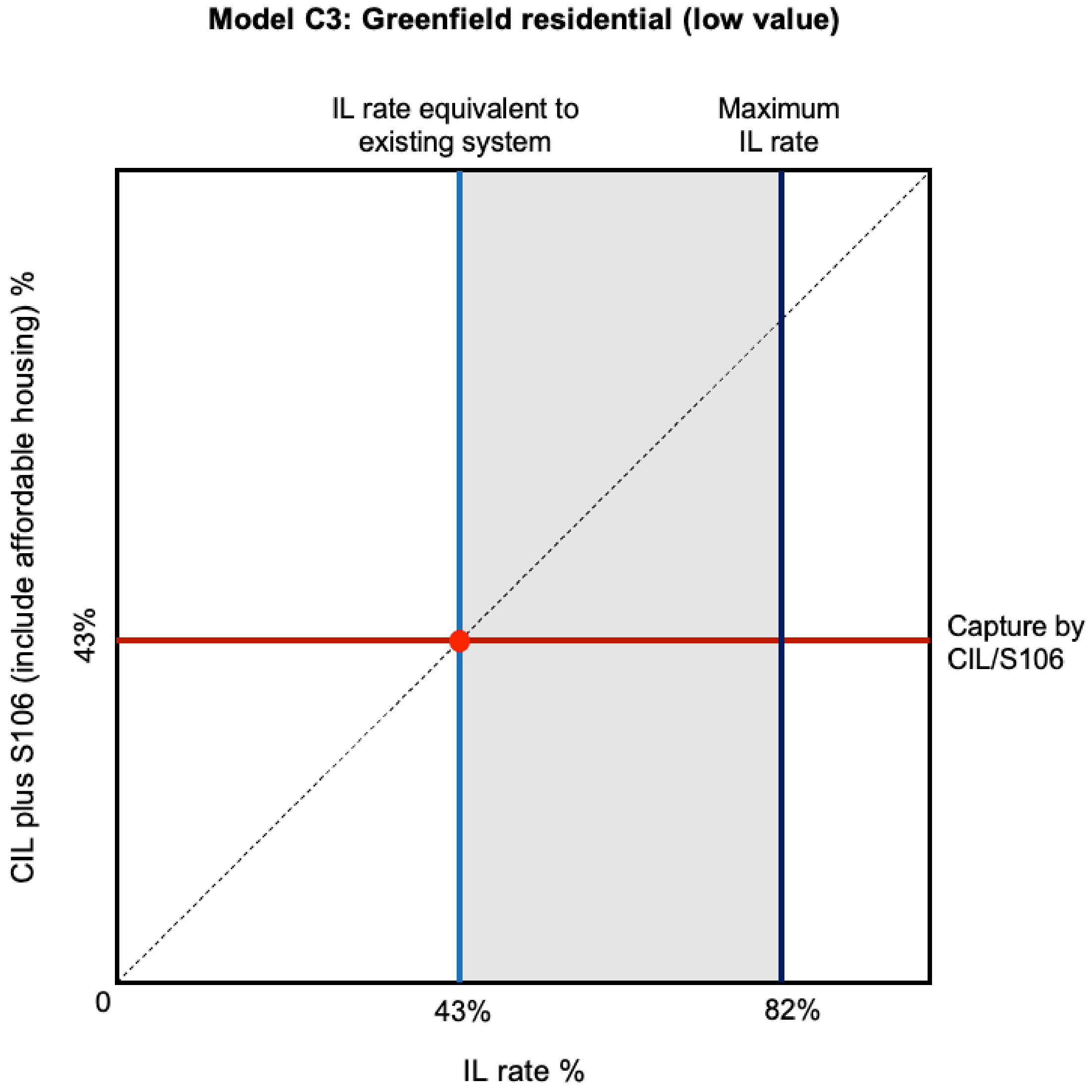
C3.6 As with the observations for Model C2, whilst in this case there is significant scope for developer contributions albeit below the scale of model C2 and significantly below that of C1, it is worth noting that the principal explanatory feature in accounting for the differential performance of the IL across these three models is development values.

Detailed model outputs

C3.7 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model C3 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table C3.1.

C3.8 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure C3.2.

Figure C3.1: IL 'window' diagram for model C3



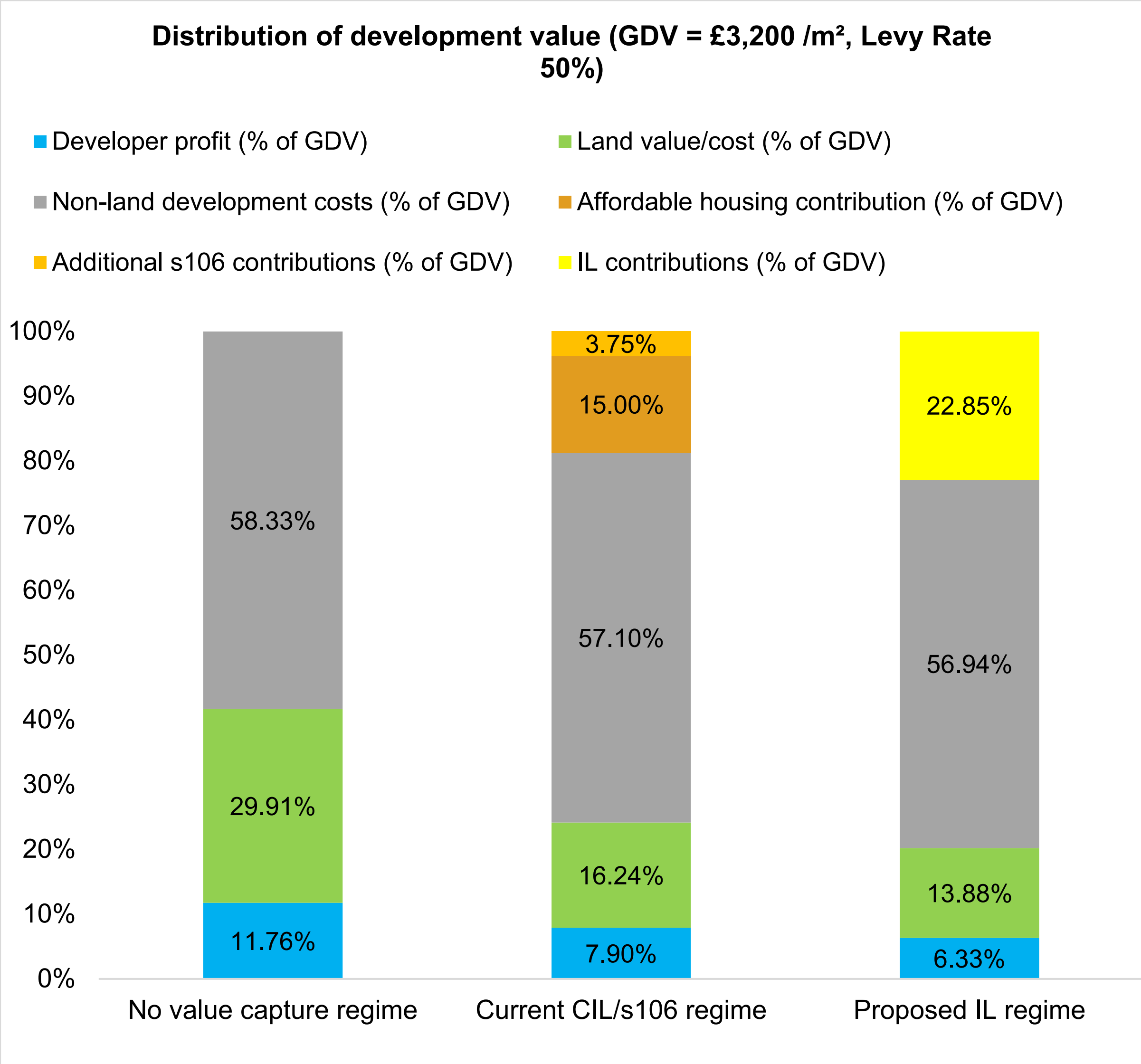
Source: Authors'

Table C3.1: Detailed model outputs for model C3

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before AH discounts)	£3,200	£3,200	£3,200
Value of affordable housing discount (£ /m² of scheme area)	£0	£480	£480
CIL/S106 (£/m² of scheme area)	£0	£120	£0
Gross IL (£/m² of scheme area)	£0	£0	£731
Net of affordable housing IL (£ /m² of scheme area)	£0	£0	£251
Affordable housing discounts as a % of value capture	n/a	80%	66%
Estimated land value (£/m² of NDA)	£287	£156	£133
Estimated land value (£/ha NDA)	£2,871,607	£1,559,477	£1,332,714
Estimated land value (£/ha GDA)	£1,722,964	£935,686	£799,628
Estimated total uplift above EUV (£/m² of NDA)	£284	£153	£130
Land value uplift captured (£/m² of NDA)	£0	£131	£154
% of total uplift captured	0%	46.23%	54.22%
Total developer investment (£)	£11,467,607	£8,343,543	£6,536,992
Estimated developer profit from project (£)	£3,385,840	£2,276,308	£1,822,176
Developer profit (£ /m² of scheme area)	£376	£253	£202
Profit margin (% of GDV)	11.76%	9.30%	7.44%
Profit margin (% of development costs)	13.32%	10.25%	8.14%
ROCE	29.53%	27.28%	27.87%
Equity multiple	1.30	1.27	1.28
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	43%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£625		
Maximum Viable IL Rate (%)	82%		
Maximum Viable IL Rate (£/m²)	£1,200		

Source: Authors'

Figure C3.2: The distribution of GDV under the three scenarios



Source: Authors'

Model C3 - Interpretation

Minimum threshold

C3.9 The minimum threshold for model C3 is £1,738/m².

Developer contributions

C3.10 Model C3 shows total developer contributions under the existing system of 18.75% of which 15% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 3.75% through CIL and non-affordable housing S106 contributions (the red shaded area).

C3.11 If set at the modelled rate of 50% the IL would recover 22.85% of the Gross Development Value (the green shaded area), 4.1% greater than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL, 15% of GDV would go to maintaining levels of affordable housing, leaving 7.85% of GDV available for infrastructure and public goods.

Land values

C3.12 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 29.91% of the total available Gross Development Value. This falls to 16.24% under the existing system and to 13.88% under the proposed IL.

C3.13 The land value reduction suggests that around £1.3 million of the land value is being captured by the existing system. This represents about 46% of the land value estimate before inclusion of any developer contributions.

C3.14 The land value estimated assuming an IL rate of 50% produces a land value of nearly £0.8 million/ha of Gross Developable Area.

C3.15 Under the IL as modelled at 50% the land value reduction suggests that around £1.5 million of the total land value is being captured. This represents a reduction of c. 54% compared to the land value estimated assuming zero developer contributions.

C3.16 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model C3 - Sensitivity Analyses

Table C3.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate sensitivity table: impact on land value estimate (£ /ha GDA)

		Minimum Threshold (£ /m²)						
	#######	**£1,100**	**£1,300**	**£1,500**	**£1,700**	**£1,900**	**£2,100**	**£2,300**
Infrastructure Levy	**10%**	£1,466,534	£1,492,126	£1,517,718	£1,543,310	£1,568,901	£1,594,493	£1,620,085
	20%	£1,197,821	£1,249,004	£1,300,188	£1,351,371	£1,402,555	£1,453,739	£1,504,922
	30%	£929,107	£1,005,882	£1,082,658	£1,159,433	£1,236,209	£1,312,984	£1,389,759
	40%	£660,393	£762,761	£865,128	£967,495	£1,069,862	£1,172,230	£1,274,597
	50%	£391,680	£519,639	£647,598	£775,557	£903,516	£1,031,475	£1,159,434
	60%	£122,966	£276,517	£430,068	£583,619	£737,170	£890,720	£1,044,271
	70%	-£145,747	£33,395	£212,538	£391,681	£570,823	£749,966	£929,109
	80%	-£414,461	-£209,727	-£4,992	£199,742	£404,477	£609,211	£813,946

Table C3.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Estimated Land Value Uplift Captured (%)

		Minimum Threshold (£ /m²)						
	£1	**£1,100**	**£1,300**	**£1,500**	**£1,700**	**£1,900**	**£2,100**	**£2,300**
Infrastructure Levy	**10%**	15%	14%	12%	11%	9%	8%	6%
	20%	31%	28%	25%	22%	19%	16%	13%
	30%	47%	42%	38%	33%	29%	24%	20%
	40%	62%	56%	50%	44%	38%	32%	26%
	50%	78%	71%	63%	56%	48%	41%	33%
	60%	94%	85%	76%	67%	58%	49%	40%
	70%	110%	99%	89%	78%	68%	57%	47%
	80%	126%	113%	101%	89%	77%	65%	53%

Table C3.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on IL receipt (£ /m² of scheme area)

		Levy rate (%)						
Minimum threshold (/m²)	£731	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
	£1,100	£420	£630	£840	£1,050	£1,260	£1,470	£1,680
	£1,300	£380	£570	£760	£950	£1,140	£1,330	£1,520
	£1,500	£340	£510	£680	£850	£1,020	£1,190	£1,360
	£1,700	£300	£450	£600	£750	£900	£1,050	£1,200
	£1,900	£260	£390	£520	£650	£780	£910	£1,040
	£2,100	£220	£330	£440	£550	£660	£770	£880
	£2,300	£180	£270	£360	£450	£540	£630	£720

Table C3.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£ /ha GDA) Levy Rate - 50%

		Market housing values (£ /m²)						
	#######	**£2,600**	**£2,800**	**£3,000**	**£3,200**	**£3,400**	**£3,600**	**£3,800**
Base build costs (£ /m²)	£1,200	£554,535	£678,144	£801,752	£925,361	£1,048,970	£1,172,578	£1,296,187
	£1,250	£512,624	£636,233	£759,842	£883,450	£1,007,059	£1,130,667	£1,254,276
	£1,300	£470,714	£594,322	£717,931	£841,539	£965,148	£1,088,756	£1,212,365
	£1,350	£428,803	£552,411	£676,020	£799,628	£923,237	£1,046,845	£1,170,454
	£1,400	£386,892	£510,500	£634,109	£757,717	£881,326	£1,004,934	£1,128,543
	£1,450	£344,981	£468,589	£592,198	£715,806	£839,415	£963,023	£1,086,632
	£1,500	£303,070	£426,678	£550,287	£673,895	£797,504	£921,112	£1,044,721
	£1,550	£261,159	£384,767	£508,376	£631,984	£755,593	£879,202	£1,002,810

Model C4: Strategic Urban Extension

Model inputs

C4.1 Model C4 is a strategic urban extension. This development type often has a much longer timescale and requires substantial upfront investment in hard and soft infrastructure. Master developers effectively create serviced sites that can be 'parcelled', then sold to and built out by several residential developers. However, such sites will also be variable in terms of size, timescale, required infrastructure, market prices and site conditions. The relatively long timescales also place increased importance on considering changes in costs and revenues over the development period. The long-term nature of the projects and their heterogeneity means that models tend to be less reliable. At the same time, appraisals of such projects require similar inputs and produce comparable outputs.

C4.2 The proposed scheme comprised a 12-year development programme of 1,500 dwellings, a local centre and a mixed B1/B2/B8 development of 10,000 square metres on a greenfield site.

C4.3 The site is assumed to have a gross developable area of 750 hectares and a net developable area of 400 hectares.

C4.4 Strategic infrastructure costs of £27,000 per dwelling at current cost levels. After a mobilisation period of one year, three quarters of the strategic infrastructure costs would be incurred in Years 2-4 with the remainder spread equally over Years 5-7.

C4.5 Residential sales were assumed to be spread equally over Years 3-12.

C4.6 Given the timescale of the project, growth and cost inflation were incorporated. It was assumed that house prices would grow at 3.5% per annum. This approximates Savills' five-year forecast for house price growth in the South East. It was assumed that construction costs would grow at 4% per annum. This approximates the five-year tender price inflation forecast from BCIS.

C4.7 Since they are essential enabling work required for development to proceed, strategic infrastructure works were not classified as S106 contributions. It was considered that this would distort the estimate of land value capture. In effect, such enabling works would have to be carried by the developer and do not involve land value capture.

C4.8 As with models C1, C2 and C3 the strategic urban extension model assumes a level of 30% of housing to be affordable of which 14.4% would be social rented, 7.5% would be affordable rent and 8.1% should be an intermediate tenure.

The Levy rate 'window'

C4.9 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

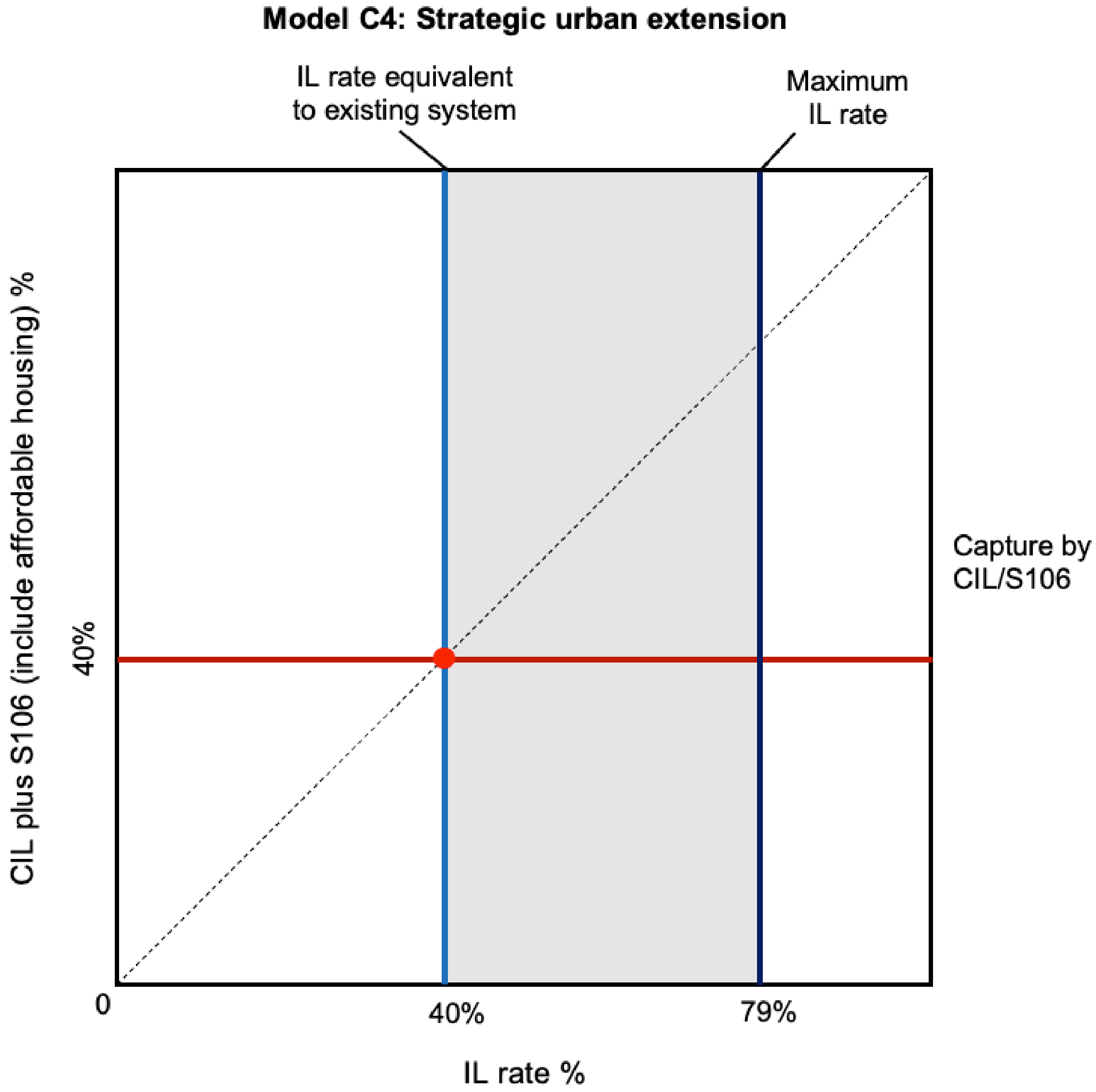
C4.10 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 79%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model C4 this lower bound estimate value for IL is 40%. Figure C4.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

Detailed model outputs

C4.11 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model C4 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table C4.1.

C4.12 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure C4.2.

Figure C4.1: IL 'window' diagram for model C4



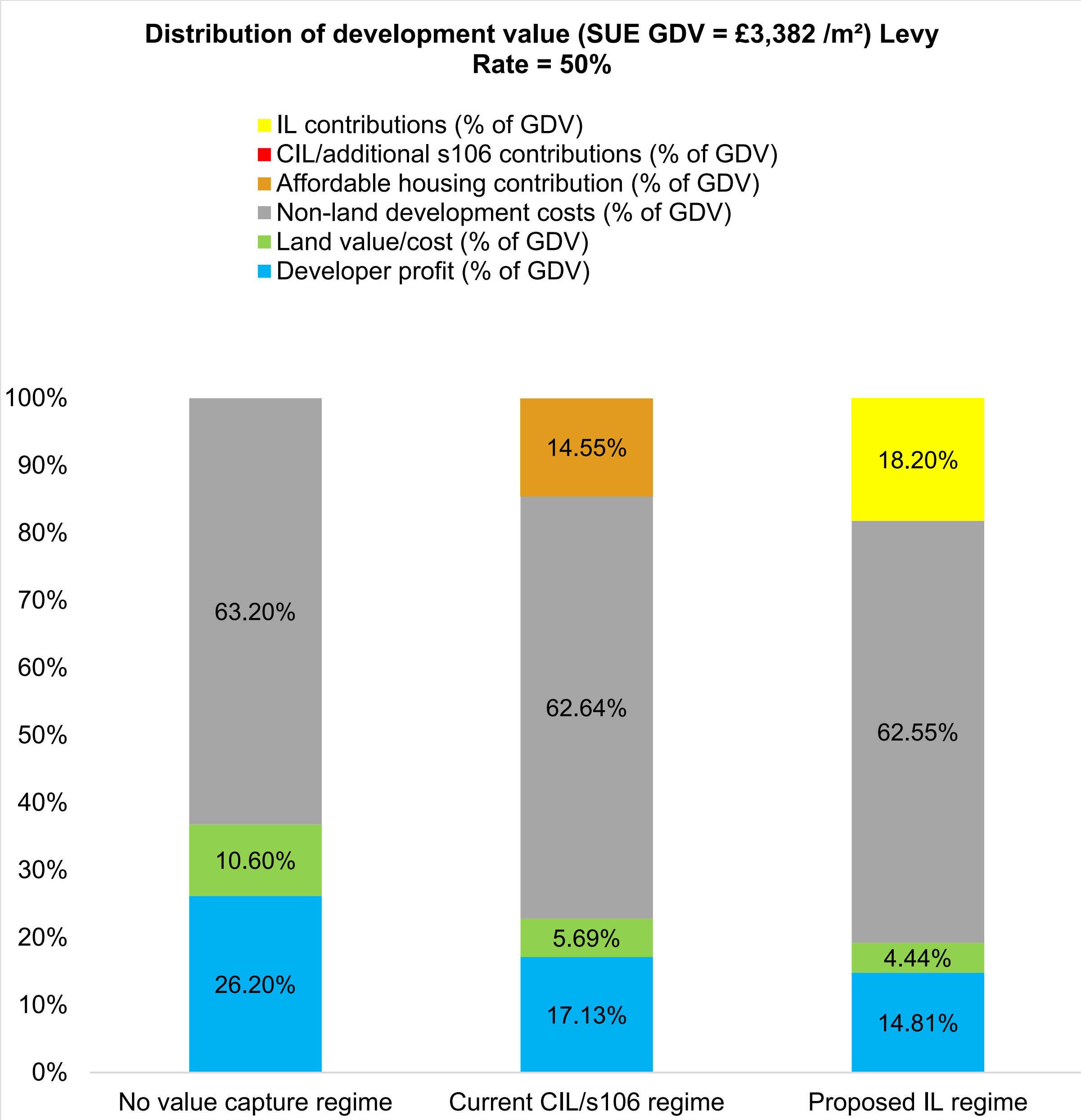
Source: Authors'

Table C4.1: Detailed model outputs for model C4

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before AH discounts)	£3,382	£3,382	£3,382
Value of affordable housing discount (£/m² of scheme area)	£0	£527	£527
CIL/S106 (£/m² of scheme area)	£0	£0	£0
Gross IL (£/m² of scheme area)	£0	£0	£659
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£132
Affordable housing discounts as a % of value capture	n/a	100%	80%
Estimated land value (£/m² of NDA)	£157	£84	£66
Estimated land value (£/ha NDA)	£1,566,758	£840,730	£656,229
Estimated land value (£/ha GDA)	£835,604	£448,389	£349,989
Estimated total uplift above EUV (£/m² of NDA)	£153	£80	£62
Land value uplift captured (£/m² of NDA)	£0	£73	£91
% of total uplift captured	0%	47.48%	59.54%
Total developer investment (£)	£88,282,005	£57,266,109	£49,384,197
Estimated developer profit from project (£)	£154,974,431	£101,313,451	£87,604,041
Developer profit (£ /m² of scheme area)	£1,138	£744	£644
Profit margin (% of GDV)	26.20%	20.04%	17.33%
Profit margin (% of development costs)	35.50%	25.07%	21.06%
ROCE	175.54%	176.92%	177.39%
Equity multiple	2.76	2.77	2.77
IRR (p.a.)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	40%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£526		
Maximum Viable IL Rate (%)	79%		
Maximum Viable IL Rate (£/m²)	£1,047		

Source: Authors'

Figure C4.2: The distribution of GDV under the three scenarios



Source: Authors'

Model C4 - Interpretation

Minimum threshold

C4.13 The minimum threshold for model C4 is £2,065.

Developer contributions

C4.14 Model C4 shows total developer contributions under the existing system of 14.55% of which the total comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area). For a strategic urban extension where attendant infrastructure and public goods are an essential aspect of scheme delivery their contributions are not recorded as an aspect of the S106 requirement: this observation explains why the S106 contribution is wholly accounted for by affordable housing.

C4.15 Should the IL be set at the modelled rate of 50% it would recover 18.2% of the Gross Development Value (the green shaded area), 3.65% more than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL, 14.55% of GDV that would go to maintaining levels of affordable housing, leaving 3.65% of GDV available for infrastructure and public goods.

Land values

C4.16 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 10.60% of the total available Gross Development Value. This falls to 5.69% under the existing system and to 4.44% under the modelled IL.

C4.17 The existing system captures around 54% of the land value estimate compared to the policy free scenario.

C4.18 If the IL were set at the modelled rate of 50% land values would be depressed by 58% compared to the land value estimated assuming zero developer contributions.

C4.19 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model C4 - Sensitivity Analyses

Table C4.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA)

		Residential sale price (£ /m²)						
	#######	**£2,900**	**£3,100**	**£3,300**	**£3,500**	**£3,700**	**£3,900**	**£4,100**
Base build costs (3 /m²)	**£1,650**	-£235,911	-£111,477	£12,956	£137,389	£261,822	£339,720	£417,264
	£1,550	-£132,244	-£7,811	£116,623	£239,751	£317,295	£394,839	£472,383
	£1,450	-£28,577	£95,856	£217,326	£294,870	£372,414	£449,957	£527,501
	£1,350	£75,090	£194,901	£272,445	£349,989	£427,532	£505,076	£582,620
	£1,250	£172,476	£250,020	£327,563	£405,107	£482,651	£560,195	£637,738
	£1,150	£227,595	£305,138	£382,682	£460,226	£537,769	£615,313	£692,857
	£1,050	£282,713	£360,257	£437,801	£515,344	£592,888	£670,432	£747,975
	£950	£337,832	£415,375	£492,919	£570,463	£648,007	£725,550	£803,094

Table C4.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA) Levy Rate =50%

		Minimum Threshold (£ /m²)						
	#######	**£1,700**	**£1,800**	**£1,900**	**£2,000**	**£2,100**	**£2,200**	**£2,300**
Levy Rate (%)	**10%**	£448,389	£448,389	£448,389	£448,389	£448,389	£448,389	£448,389
	20%	£448,389	£448,389	£448,389	£448,389	£448,389	£448,389	£448,389
	30%	£448,389	£448,389	£448,389	£448,389	£448,389	£448,389	£448,389
	40%	£339,287	£369,163	£399,039	£428,915	£448,389	£448,389	£448,389
	50%	£213,630	£250,975	£288,320	£325,665	£363,010	£400,355	£437,700
	60%	£87,974	£132,788	£177,602	£222,415	£267,229	£312,043	£356,857
	70%	-£37,683	£14,600	£66,883	£119,166	£171,449	£223,731	£276,014
	80%	-£163,339	-£103,587	-£43,836	£15,916	£75,668	£135,420	£195,172

Table C4.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA)

		Strategic infrastructure costs (£ /m² of scheme size)						
		£150	**£200**	**£250**	**£300**	**£350**	**£400**	**£450**
Cost inflation (% p.a)	**1%**	£716,871	£686,285	£655,700	£625,114	£594,528	£563,943	£533,357
	2%	£635,643	£603,341	£571,040	£538,738	£506,436	£474,134	£441,832
	3%	£549,356	£515,285	£481,215	£447,144	£413,074	£379,003	£344,932
	4%	£457,668	£421,775	£385,882	£349,989	£314,095	£278,202	£242,309
	5%	£360,218	£322,446	£284,675	£246,904	£209,132	£171,361	£133,589
	6%	£256,617	£216,910	£177,204	£137,497	£97,790	£58,084	£18,377
	7%	£146,452	£104,752	£63,051	£21,351	-£20,350	-£62,050	-£103,751
	8%	£29,283	-£14,471	-£58,226	-£101,981	-£145,736	-£189,491	-£233,246

Case Study D: Rural towns

D1.1 Case Study D has a median house price in the region of £240,000 per dwelling, saw house prices rising steadily several years ago, but has levelled off in the last couple of years. Median incomes in the authority are in the region of £30,000 and have been increasing in recent years. The affordability ratio of median incomes to median house prices has therefore decreased over the last couple of years to around 8.

D1.2 For Case Study D over the five-year period 2016-2020, the scale of new housing delivered has been, on average, approximately 1,600 dwellings per annum. As year-on-year household growth has been averaging approximately 1,000 more households per year, recent housing delivery is about 150% of what household growth in the local authority would suggest is required.

D1.3 In order to estimate new build house prices in local authority Case Study D we take land registry price paid data and apply a local authority-specific uplift to reflect the locally specific premium paid for new builds in comparison to the secondary market for new dwellings. For Case Study D this premium is 2.8% and is used to compute the values set out in Table D1.1. It should also be noted that the land registry price paid data excludes all categories of affordable housing, the sale of right-to-buy properties, transfers and actions resulting from the enactment of Compulsory Purchase Order powers and court orders.

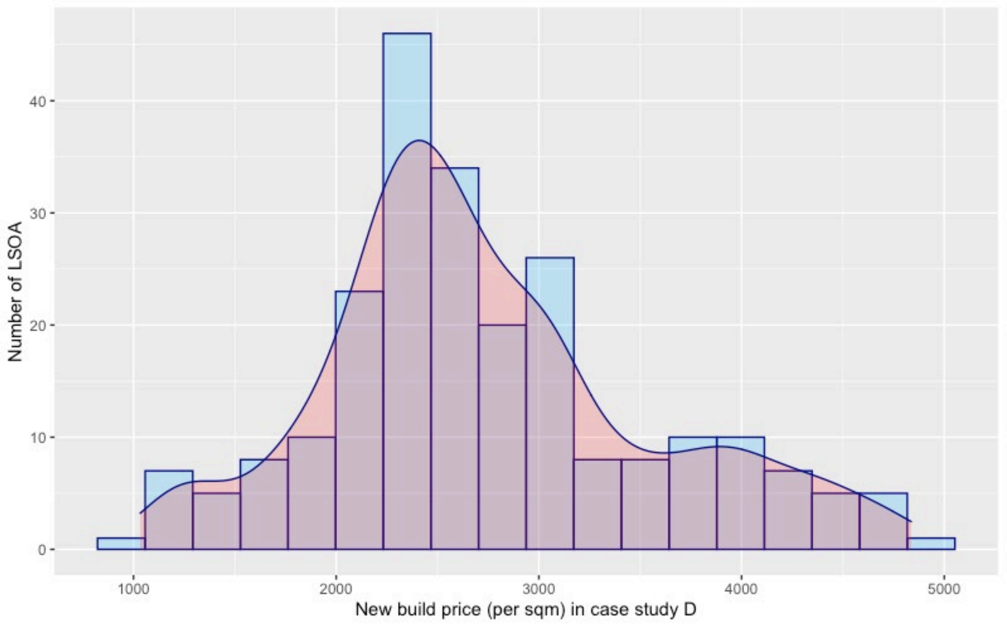
D1.4 Case Study D is also a heterogeneous new build housing market. New build house prices vary between approximately £1,000m² and £4,800m² across the full extent of the LSOAs that comprise the local authority. Development values for new build house prices vary by a factor of approximately 5. Summary statistics on the variability in new build residential prices is contained in Table D1.1 and Figure D1.1.

Table D1.1 Approximate new build house prices in Case Study D (2020)

House price	Average	1st quartile	Median	3rd quartile
New Build	310,000	170,000	240,000	360,000
New Build £/m²	2,800	2,100	2,600	3,300

Source: Authors’ calculations from HMLR ‘price paid’ data

Figure D1.1 Approximate new build house prices by LSOA in Case Study D (2020)



Source: Authors' calculations from HMLR 'price paid' data

Affordable housing, planning obligations and CIL

D1.5 Case Study D is a CIL-charging unitary authority.

D1.6 Local planning policy states that between 30% of private developments will be affordable housing (routinely provided as affordable rent and intermediate rent). The Case Study is a CIL charging authority, with CIL charges ranging from £0/m^2 up to £70/m^2.

D1.7 In recent years the case study has had over 1,000 planning applications submitted each year, with an average of around 600 for residential developments per annum.

Model outputs for Case Study D

D1.8 This local authority is a member of the Rural Towns family.

D1.9 The local authority requested three residential schemes and a distribution-led scheme to be modelled – all in greenfield settings. The three residential developments are all low-density schemes in respectively higher (Model D1), median (Model D2) and lower (Model D3) value settings.

D1.10 The local authority specified a uniform affordable housing policy for all modelled sites requiring 30% of housing to be affordable of which 9.75% should be social rented, 9.75% should be affordable rent, 7.5% should be First Homes and the remaining 3% should be intermediate tenure.

D1.11 Developer contributions were modelled on the basis of CIL liabilities of £71/m² (Model D1), £22/m² (Model D2) and £0/m² (Model D3) respectively. For all three residential development scenarios, it was estimated that, in addition to any affordable housing contributions, further S106 contributions amounting to £25/m² would be incurred.

Model D1 - Residential development (upper quartile house price = £3,300/m²)

Model inputs

D1.12 Model D1 is a greenfield development occupying a five-hectare site (gross development area) in a higher value setting providing a mixture of low-density apartments and single-family homes.

D1.13 The local authority specified an affordable housing requirement of 30% of which 9.75% should be social rented, 9.75% should be affordable rent, 7.5% should be First Homes and the remaining 3% should be intermediate tenure.

D1.14 CIL is applied at £70/m² in this higher value setting and S106 contributions are set at £25/m².

The Levy rate 'window'

D1.15 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

D1.16 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 84%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model D1 this lower bound estimate value for IL is 33%. Figure D1.2 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

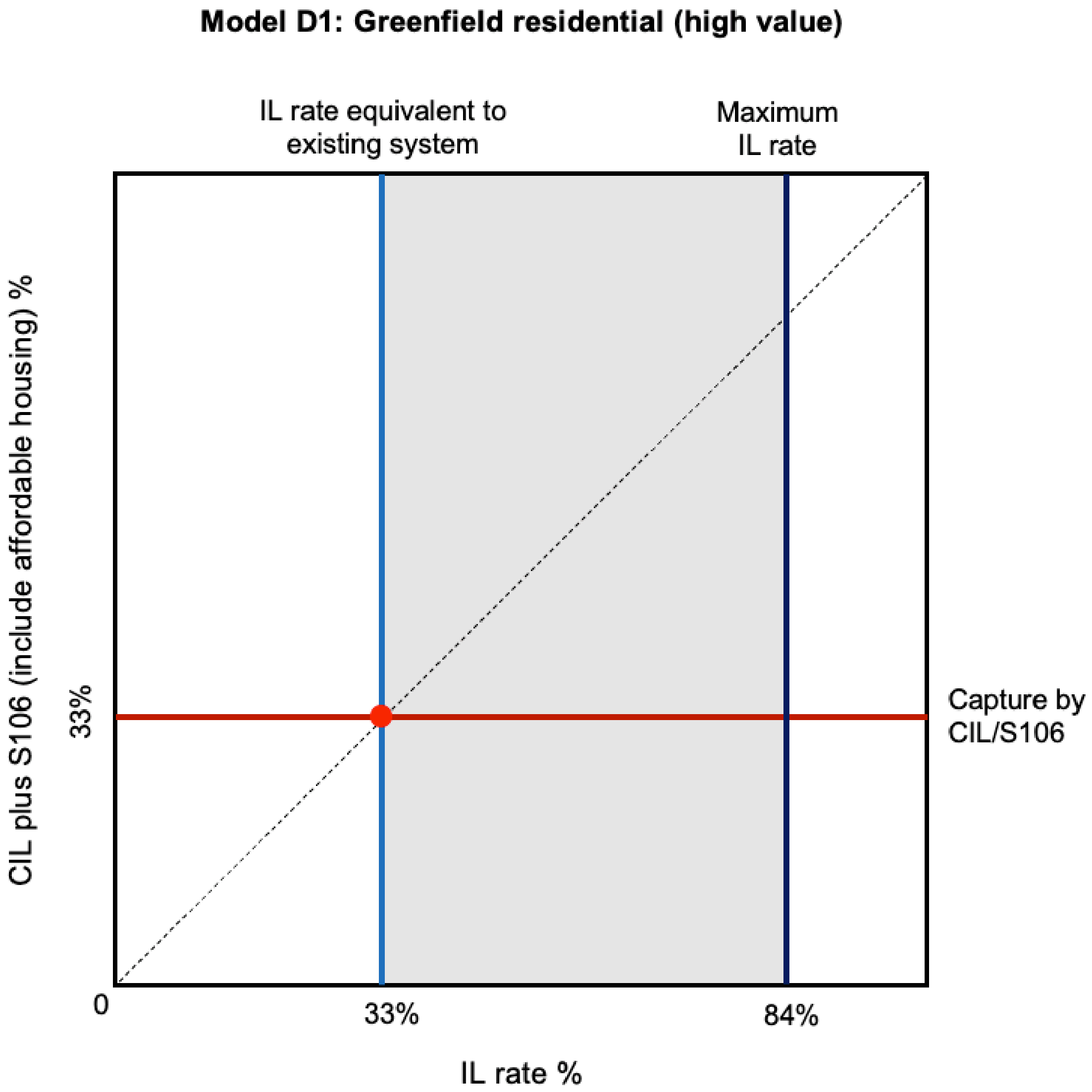
D1.17 In this case there is significant scope for developer contributions above the levels that have been achieved historically under the existing system on a modelled site of this nature, assuming the Benchmark Land Value accurately represents the cost of the land.

Detailed model outputs

D1.18 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model D1 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table D1.2.

D1.16 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure D1.3.

Figure D1.2: IL 'window' diagram for model D1



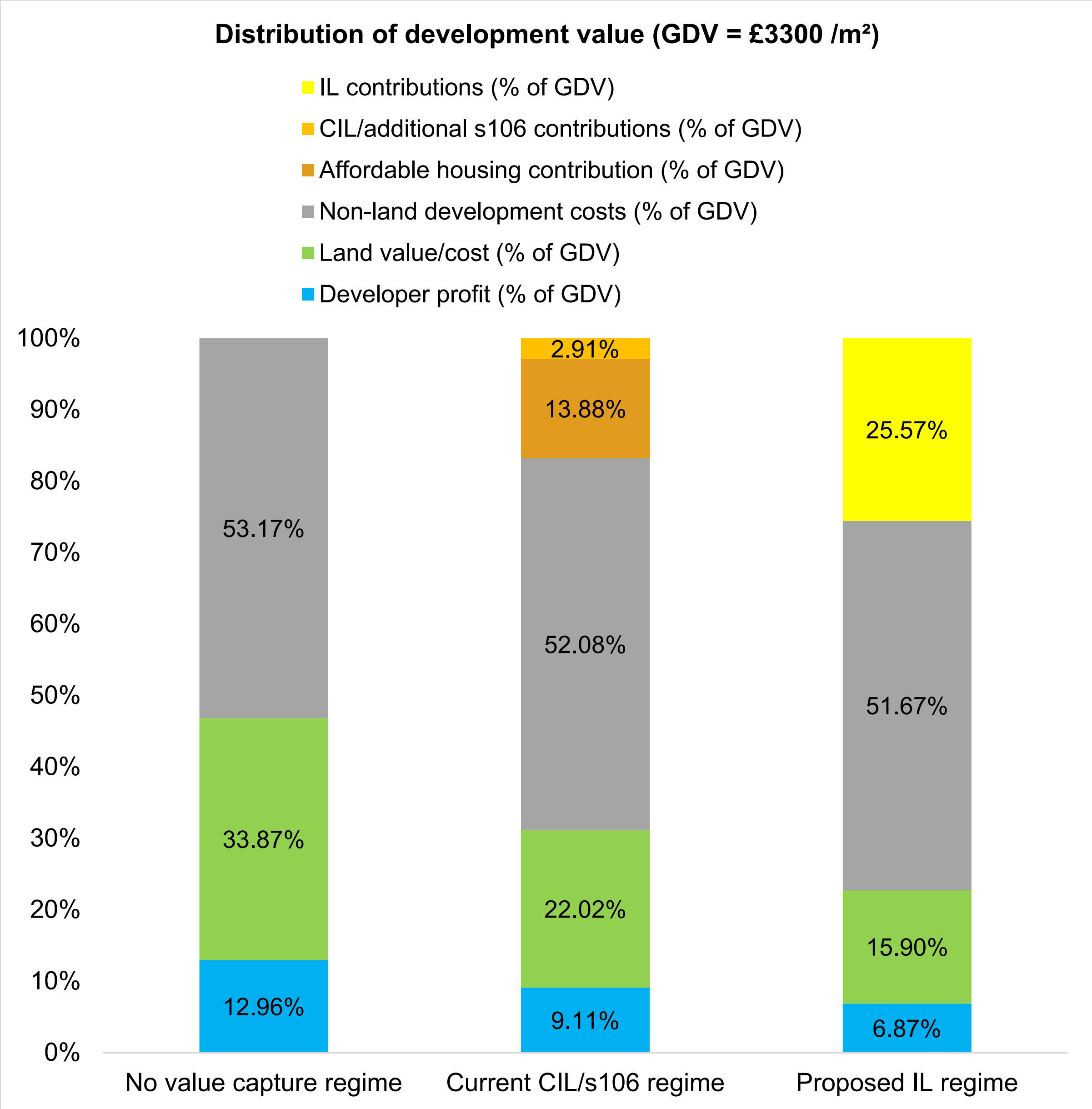
Source: Authors'

Table D1.2: Detailed model outputs for model D1

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before AH discounts)	£3,300	£3,300	£3,300
Value of affordable housing discount (£ /m² of scheme area)	£0	£458	£458
CIL/S106 (£/m² of scheme area)	£0	£96	£0
Gross IL (£/m² of scheme area)	£0	£0	£844
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£386
Affordable housing discounts as a % of value capture	n/a	83%	54%
Estimated land value (£/m² of NDA)	£335	£218	£157
Estimated land value (£/ha NDA)	£3,353,601	£2,179,806	£1,573,808
Estimated land value (£/ha GDA)	£2,012,160	£1,307,883	£944,285
Estimated total land value uplift above EUV (£/m² of NDA)	£332	£215	£154
Land value uplift captured (£/m² of NDA)	£0	£117	£178
% of total uplift captured	0%	35.35%	53.60%
Total developer investment (£)	£12,877,323	£9,405,384	£7,174,866
Estimated developer profit from project (£)	£3,848,532	£2,706,918	£2,040,091
Developer profit (£/m² of scheme area)	£428	£301	£227
Profit margin (% of GDV)	12.96%	10.58%	7.98%
Profit margin (% of development costs)	14.89%	11.83%	8.79%
ROCE	29.89%	28.78%	28.43%
Equity multiple	1.30	1.29	1.28
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	33%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£560		
Maximum Viable IL Rate (%)	84%		
Maximum Viable IL Rate (£/m²)	£1,425		

Source: Authors'

Figure D1.3: The distribution of GDV under the three scenarios



Source: Authors'

Model D1 - Interpretation

Minimum threshold

D1.20 The minimum threshold for model D1 is £1,613.

Developer contributions

D1.21 Model D1 shows total developer contributions under the existing system of 16.79% of which 13.88% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 2.91% through CIL and non-affordable housing S106 contributions (the red shaded area).

D1.22 If the IL were set at the modelled rate of 50% it would recover 25.57% of the Gross Development Value (the green shaded area), 8.78% greater than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL, 13.88% of GDV would go to maintaining levels of affordable housing, leaving 11.69%% of GDV available for infrastructure and public goods.

Land values

D1.23 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 33.87% of the total available Gross Development Value. This falls to 22.02% under the existing system and to 15.90% under the proposed IL.

D1.24 The land value reduction suggests that around £1.2 million of the land value is being captured under the existing system, resulting in a reduction of c.35% of the land value estimate with zero developer contributions.

D1.25 At the modelled IL rate of 50% around £1.8 million of the land value is being captured. This represents a reduction of c.53% compared to the land value estimated assuming zero developer contributions.

D1.26 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model D1 - Sensitivity Analyses

Table D1.3: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA)

		Minimum Threshold (£ /m²)						
	£944,285	**£500**	**£750**	**£1,000**	**£1,250**	**£1,500**	**£1,750**	**£2,000**
Infrastructure Levy	**10%**	£1,665,593	£1,697,583	£1,729,572	£1,761,562	£1,793,552	£1,825,542	£1,857,531
	20%	£1,307,308	£1,371,287	£1,435,267	£1,499,246	£1,563,226	£1,627,205	£1,691,185
	30%	£949,023	£1,044,992	£1,140,961	£1,236,931	£1,332,900	£1,428,869	£1,524,839
	40%	£590,738	£718,697	£846,656	£974,615	£1,102,574	£1,230,533	£1,358,492
	50%	£232,453	£392,402	£552,351	£712,300	£872,248	£1,032,197	£1,192,146
	60%	-£125,832	£66,107	£258,045	£449,984	£641,922	£833,861	£1,025,800
	70%	-£484,117	-£260,188	-£36,260	£187,668	£411,597	£635,525	£859,453
	80%	-£842,402	-£586,484	-£330,565	-£74,647	£181,271	£437,189	£693,107

Table D1.4: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Estimated Land Value Uplift Captured (% of land value uplift)

		Minimum Threshold (£ /m²)						
	£1	**£500**	**£750**	**£1,000**	**£1,250**	**£1,500**	**£1,750**	**£2,000**
Infrastructure Levy	**10%**	17%	16%	14%	13%	11%	9%	8%
	20%	35%	32%	29%	26%	23%	19%	16%
	30%	53%	49%	44%	39%	34%	29%	24%
	40%	71%	65%	59%	52%	46%	39%	33%
	50%	89%	81%	73%	65%	57%	49%	41%
	60%	107%	98%	88%	78%	69%	59%	50%
	70%	125%	114%	103%	92%	80%	69%	58%
	80%	143%	130%	118%	105%	92%	79%	66%

Table D1.5: Impact on IL receipts at varying rates of IL and minimum threshold (source: Authors').

Bivariate Sensitivity Table: Impact on IL receipt (£/m² of scheme area)

Minimum threshold (/m²)	Levy rate (%)						
	20%	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
£2,000	£260	£390	£520	£650	£780	£910	£1,040
£1,750	£310	£465	£620	£775	£930	£1,085	£1,240
£1,500	£360	£540	£720	£900	£1,080	£1,260	£1,440
£1,250	£410	£615	£820	£1,025	£1,230	£1,435	£1,640
£1,000	£460	£690	£920	£1,150	£1,380	£1,610	£1,840
£750	£510	£765	£1,020	£1,275	£1,530	£1,785	£2,040
£500	£560	£840	£1,120	£1,400	£1,680	£1,960	£2,240

Table D1.6: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate Sensitivity Table: Impact on land value (£/ha GDA – proposed IL 50% Levy Rate)

Base build costs (£ /m²)	Value of private housing (£ /m²)						
	£2,700	**£2,900**	**£3,100**	**£3,300**	**£3,500**	**£3,700**	**£3,900**
£1,600	£280,255	£403,806	£527,357	£650,908	£774,459	£898,010	£1,021,561
£1,500	£364,077	£487,628	£611,179	£734,730	£858,281	£981,832	£1,105,383
£1,400	£447,899	£571,450	£695,001	£818,552	£942,103	£1,065,654	£1,189,205
£1,300	£531,721	£655,272	£778,823	£902,374	£1,025,925	£1,149,475	£1,273,026
£1,200	£615,543	£739,094	£862,645	£986,195	£1,109,746	£1,233,297	£1,356,848
£1,100	£699,364	£822,915	£946,466	£1,070,017	£1,193,568	£1,317,119	£1,440,670
£1,000	£783,186	£906,737	£1,030,288	£1,153,839	£1,277,390	£1,400,941	£1,524,492

Model D2: Residential development (median house price = £2,600/m²)

Model inputs

D2.1 Model D2 is a greenfield development on a five-hectare site (gross development area) in a median value setting providing a mixture of low-density apartments and single-family homes.

D2.2 The local authority specified an identical affordable housing requirement to Model D1 of 30% of which 9.75% should be social rented, 9.75% should be affordable rent, 7.5% should be First Homes and the remaining 3% should be intermediate tenure.

D2.3 CIL is applied at £20/m² in this median value setting and S106 contributions are set at £25/m².

The Levy rate 'window'

D2.4 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

D2.5 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 75%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model D2 this lower bound estimate value for IL is 42%. Figure D2.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

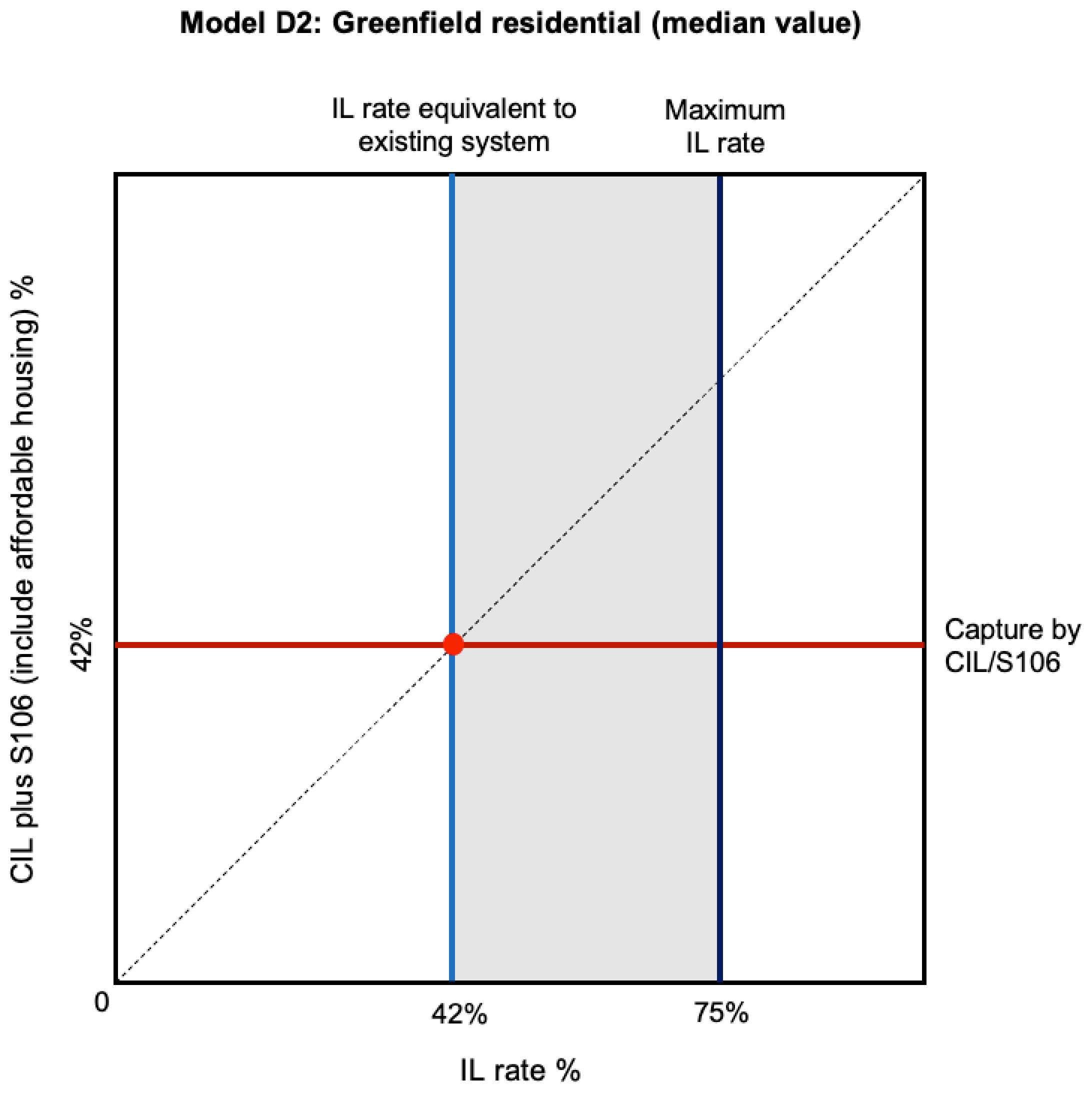
D2.6 Based on the modelling, in this case there is significant scope for developer contributions - although somewhat less than in the higher value setting represented by Model D1. It is worth noting that the principal explanatory feature in accounting for the differential performance of the IL is development values.

Detailed model outputs

D2.7 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model D2 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table D2.1.

D2.8 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure D2.2.

Figure D2.1: IL 'window' diagram for model D2



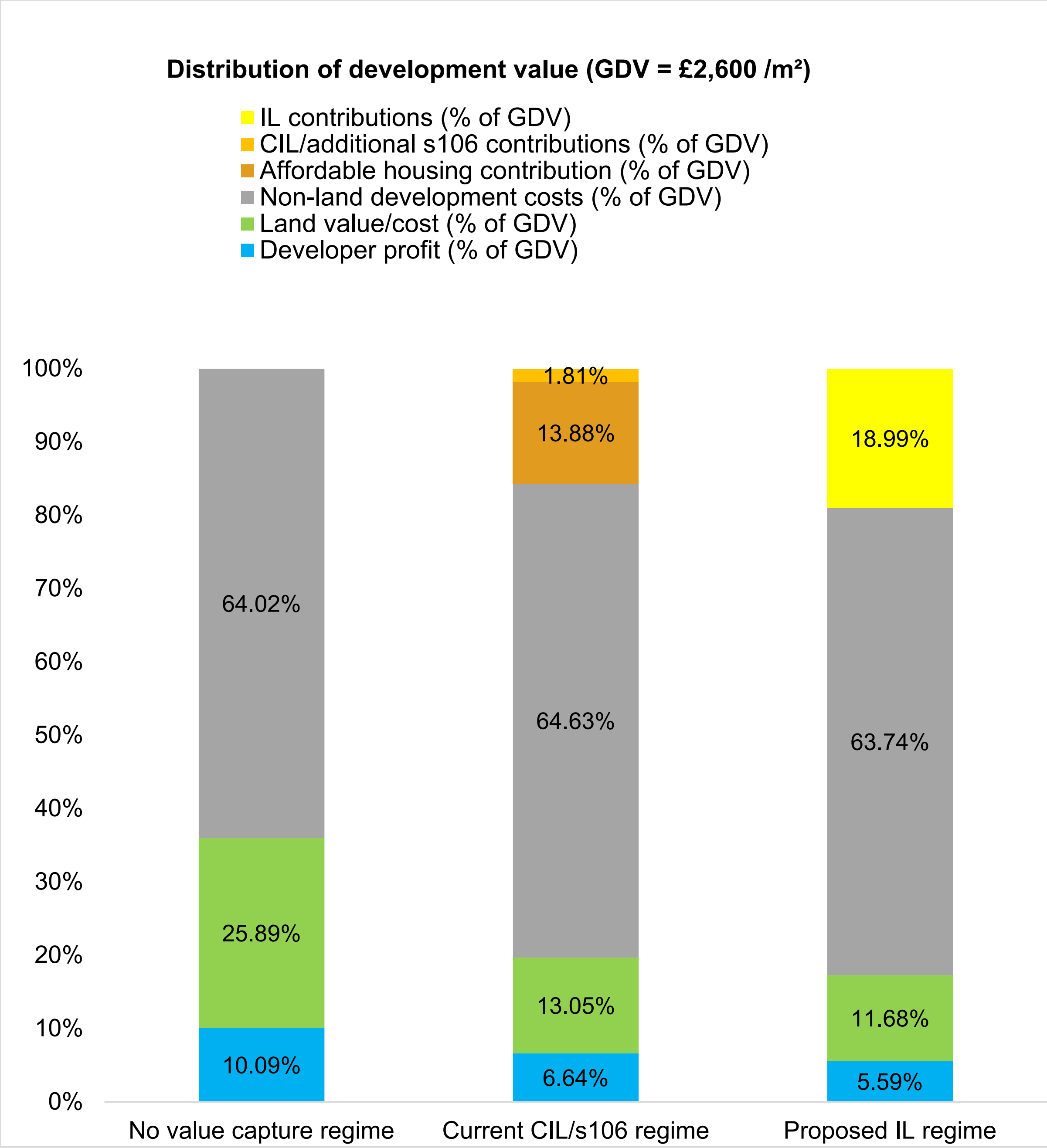
Source: Authors'

Table D2.1: Detailed model outputs for model D2

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before AH discounts)	£2,600	£2,600	£2,600
Value of affordable housing discount (£/m² of scheme area)	£0	£361	£361
CIL/S106 (£/m² of scheme area)	£0	£47	£0
Gross IL (£/m² of scheme area)	£0	£0	£494
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£133
Affordable housing discounts as a % of value capture	n/a	88%	73%
Estimated land value (£/m² of NDA)	£189	£102	£85
Estimated land value (£/ha NDA)	£1,890,602	£1,018,010	£853,094
Estimated land value (£/ha GDA)	£1,134,361	£610,806	£511,856
Estimated total uplift above EUV (£/m² of NDA)	£186	£98	£82
Land value uplift captured (£/m² of NDA)	£0	£87	£104
% total uplift captured	0%	46.98%	55.86%
Total developer investment (£)	£8,189,876	£5,718,092	£4,865,699
Estimated developer profit from project (£)	£2,361,985	£1,552,958	£1,307,777
Developer profit (£/m² of scheme area)	£262	£173	£145
Profit margin (% of GDV)	10.09%	7.71%	6.49%
Profit margin (% of development costs)	11.23%	8.35%	7.00%
ROCE	28.84%	27.16%	26.88%
Equity multiple	1.29	1.27	1.27
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	42%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£416		
Maximum Viable IL Rate (%)	75%		
Maximum Viable IL Rate (£/m²)	£737		

Source: Authors'

Figure D2.2: The distribution of GDV under the three scenarios



Source: Authors'

Model D2 - Interpretation

Minimum threshold

D2.9 The minimum threshold for model D2 is £1,613.

Developer contributions

D2.10 Model D2 shows total developer contributions under the existing system of 15.69% of which 13.88% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 1.81% through CIL and non-affordable housing S106 contributions (the red shaded area).

D2.11 If the IL were set at the modelled rate of 50% it would recover 18.99% of the Gross Development Value (the green shaded area), 3.3% greater than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL, 13.88% of GDV would go to maintaining levels of affordable housing, leaving 5.11% of GDV available for infrastructure and public goods.

Land values

D2.12 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 25.89% of the total available Gross Development Value. This falls to 13.05% under the existing system and to 11.68% under the proposed IL.

D2.13 The land value reduction suggests that the existing system captures around £0.9 million of the land value representing a reduction of c. 46% of the land value estimate with zero developer contributions.

D2.14 The total developer's profit is estimated at £1.3 million for a required investment of £4.86 million producing an estimated Return on Capital Employed of just over 27%.

D2.15 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model D2 - Sensitivity analyses

Table D2.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA)

Base build costs £ /m²		Market housing (£ /m²)						
		£2,300	**£2,400**	**£2,500**	**£2,600**	**£2,700**	**£2,800**	**£2,900**
	£900	£619,906	£681,682	£743,457	£805,233	£867,008	£928,784	£990,559
	£1,000	£536,084	£597,860	£659,635	£721,411	£783,186	£844,962	£906,737
	£1,100	£452,263	£514,038	£575,814	£637,589	£699,364	£761,140	£822,915
	£1,200	£368,441	£430,216	£491,992	£553,767	£615,543	£677,318	£739,094
	£1,300	£284,619	£346,394	£408,170	£469,945	£531,721	£593,496	£655,272
	£1,400	£200,797	£262,572	£324,348	£386,123	£447,899	£509,674	£571,450
	£1,500	£116,975	£178,751	£240,526	£302,302	£364,077	£425,852	£487,628
	£1,600	£33,153	£94,929	£156,704	£218,480	£280,255	£342,031	£403,806

Table D2.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA)

Infrastructure Levy		Minimum Threshold (£ /m²)						
		£500	**£750**	**£1,000**	**£1,250**	**£1,500**	**£1,750**	**£2,000**
	5%	£1,009,236	£1,025,231	£1,041,226	£1,057,221	£1,073,216	£1,089,211	£1,105,206
	10%	£874,879	£906,869	£938,859	£970,849	£1,002,838	£1,034,828	£1,066,818
	15%	£740,523	£788,507	£836,492	£884,477	£932,461	£980,446	£1,028,430
	20%	£606,166	£670,145	£734,125	£798,104	£862,084	£926,063	£990,043
	25%	£471,809	£551,783	£631,758	£711,732	£791,707	£871,681	£951,655
	30%	£337,452	£433,421	£529,391	£625,360	£721,329	£817,299	£913,268
	35%	£203,095	£315,059	£427,024	£538,988	£650,952	£762,916	£874,880
	40%	£68,738	£196,697	£324,656	£452,616	£580,575	£708,534	£836,493

Table D2.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Estimated Land Value Uplift Captured (% of land value uplift)

Infrastructure Levy	Minimum Threshold (£ /m²)						
	£500	**£750**	**£1,000**	**£1,250**	**£1,500**	**£1,750**	**£2,000**
5%	11%	10%	8%	7%	5%	4%	3%
10%	23%	20%	18%	15%	12%	9%	6%
15%	35%	31%	27%	22%	18%	14%	10%
20%	47%	42%	36%	30%	24%	19%	13%
25%	59%	52%	45%	38%	31%	24%	16%
30%	72%	63%	54%	46%	37%	28%	20%
35%	84%	74%	63%	53%	43%	33%	23%
40%	96%	84%	73%	61%	50%	38%	27%

Table D2.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate Sensitivity Table: Impact on IL receipt (£ /m² of scheme area)

Minimum threshold (/m²)	Levy rate (%)						
	20%	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
£2,000	£120	£180	£240	£300	£360	£420	£480
£1,750	£170	£255	£340	£425	£510	£595	£680
£1,500	£220	£330	£440	£550	£660	£770	£880
£1,250	£270	£405	£540	£675	£810	£945	£1,080
£1,000	£320	£480	£640	£800	£960	£1,120	£1,280
£750	£370	£555	£740	£925	£1,110	£1,295	£1,480
£500	£420	£630	£840	£1,050	£1,260	£1,470	£1,680

Model D3 - Lower quartile house price (£2,100/m²)

Model inputs

D3.1 Model D3 is a greenfield development on a five-hectare site (gross development area) in a lower value setting providing a mixture of low-density apartments and single-family homes.

D3.2 The local authority specified an identical affordable housing requirement to Models D1 and D2 of 30% of which 9.75% should be social rented, 9.75% should be affordable rent, 7.5% should be First Homes and the remaining 3% should be intermediate tenure.

D3.3 CIL is applied at £0/m² in this lower value setting and S106 contributions are set at £25/m².

The Levy rate 'window'

D3.4 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

D3.5 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 49%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model D3 this lower bound estimate value for IL is 65%. The inversion of the upper and lower bounds implies that the policy-compliant implementation of the existing system is effectively unviable: it results in a greater scale of developer contributions than the maximum value the IL could take. This phenomenon is discussed further below. Figure D3.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

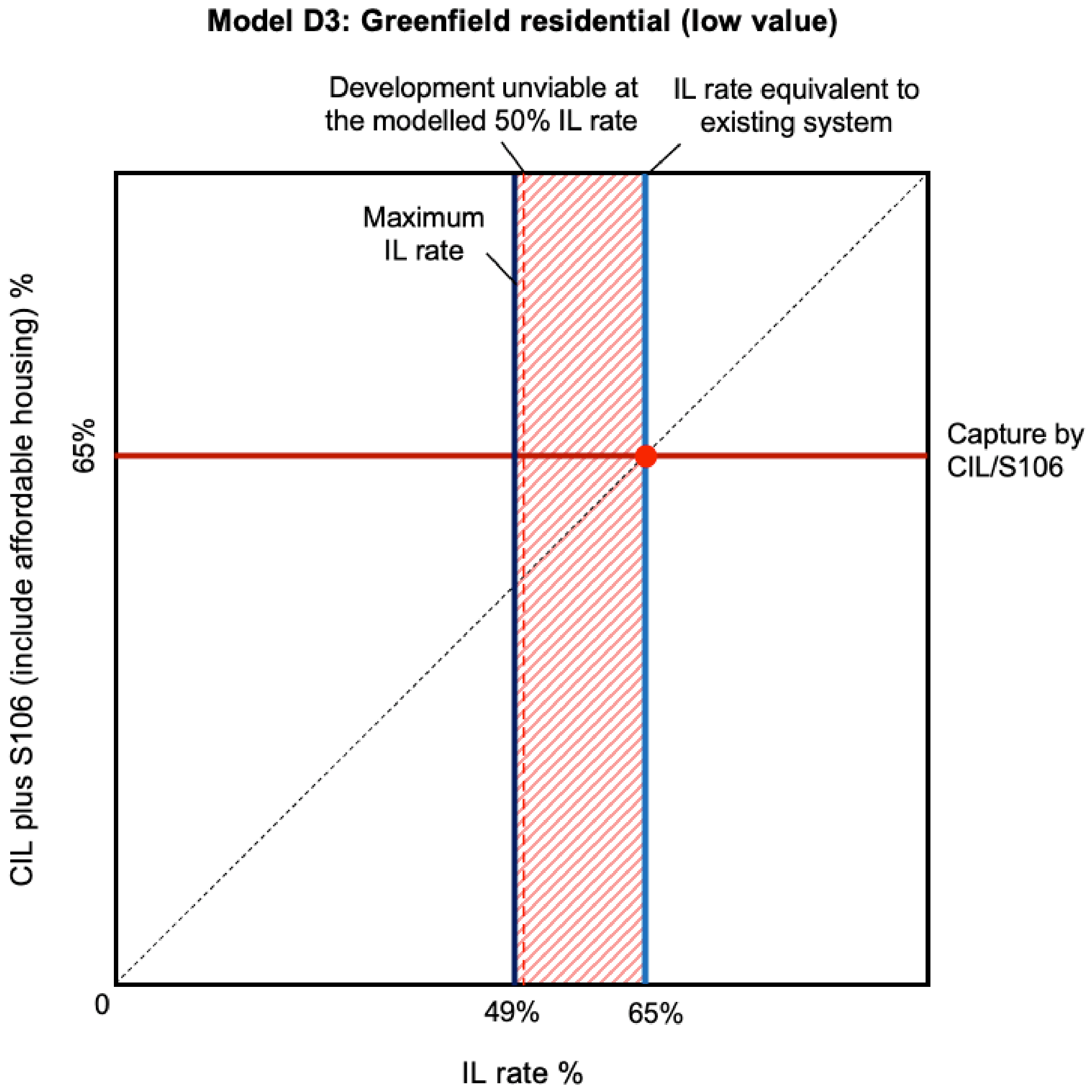
D3.6 It is clear in this case that the policy compliant levels of affordable housing result in development not being viable under either the existing or proposed systems. To make the development viable under either system the affordable housing contributions would have to fall to c. 20%.

Detailed model outputs

D3.7 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. We have chosen to apply this arbitrary rate of 50% throughout all the modelling work in the interests of consistency. However, it can clearly be seen in the case of model D3 that this hypothetical rate exceeds the maximum possible value that the IL could take. Indeed, the lower bound rate of 65% exceeds the maximum rate that the modelling analysis suggests might be applied (49%). The most likely explanation for this 'negative window' is that the policy-compliant existing system is incompatible with development viability and represents an over-statement of what might be achieved in practice. Detailed model outputs are presented in Table D3.1.

D3.8 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure D3.2.

Figure D3.1: IL 'window' diagram for model D3



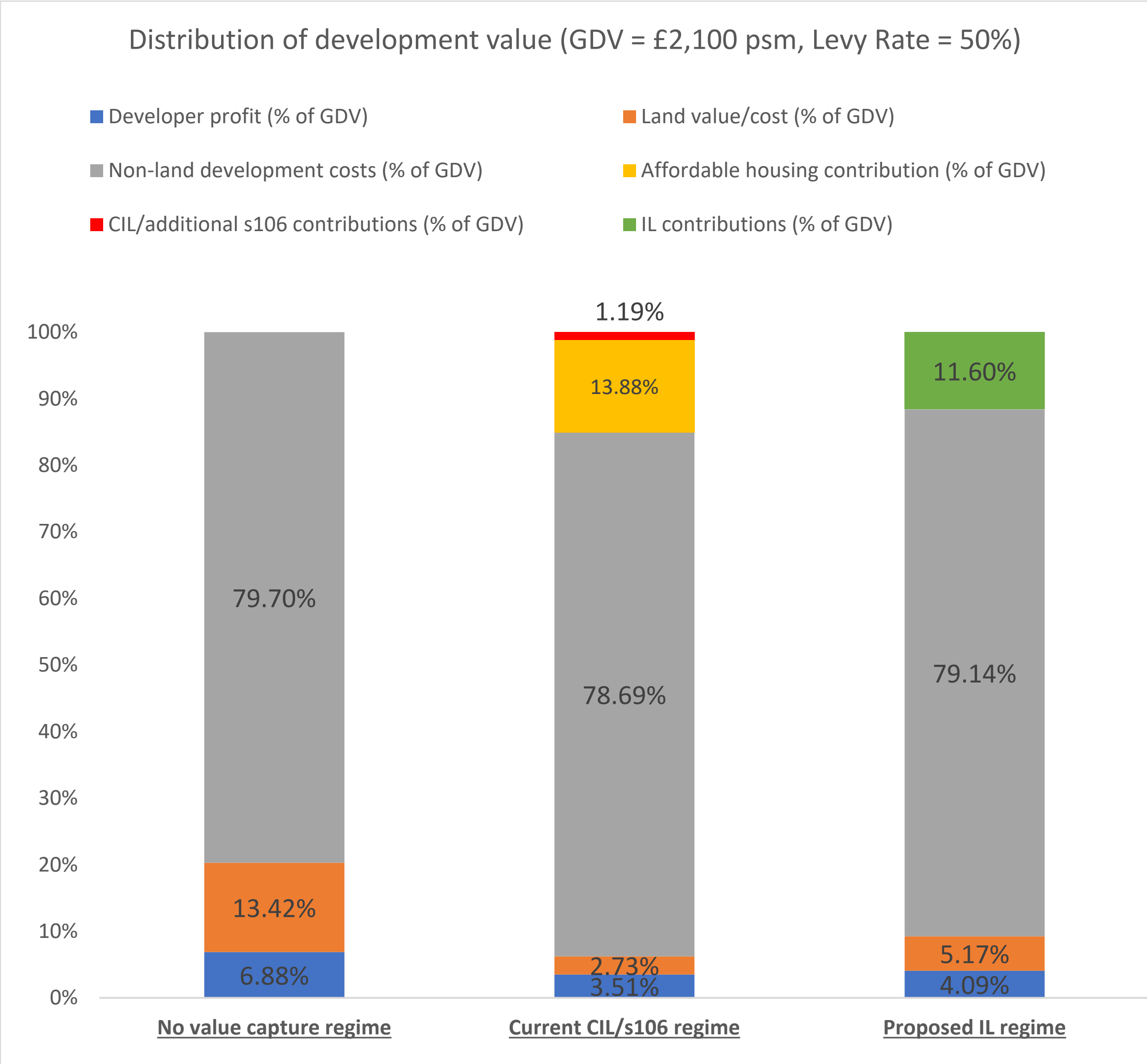
Source: Authors'

Table D3.1: Detailed model outputs for model D3

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before AH discounts)	£2,100	£2,100	£2,100
Value of affordable housing discount (£/m² of scheme area)	£0	£291	£0
CIL/S106 (£/m² of scheme area)	£0	£25	£0
Gross IL (£/m² of scheme area)	£0	£0	£244
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£244
Affordable housing discounts as a % of value capture	n/a	92%	0%
Estimated land value (£/m² of NDA)	£85	£17	£33
Estimated land value (£/ha NDA)	£845,603	£172,270	£325,871
Estimated land value (£/ha GDA)	£507,362	£103,362	£195,522
Estimated total uplift above EUV (£/m² of NDA)	£81	£14	£29
Land value uplift captured (£/m² of NDA)	£0	£67	£52
% total uplift captured	0%	82.90%	63.99%
Total developer investment (£)	£4,841,700	£2,909,338	£3,176,476
Estimated developer profit from project (£)	£1,300,166	£662,602	£772,068
Developer profit (£ /m² of scheme area)	£144	£74	£86
Profit margin (% of GDV)	6.88%	4.07%	4.09%
Profit margin (% of development costs)	7.39%	4.24%	4.27%
ROCE	26.85%	22.78%	24.31%
Equity multiple	1.27	1.23	1.24
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	No		
IL Rate (%) (equivalent to current CIL/S106)	65%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£316		
Maximum Viable IL Rate (%)	49%		
Maximum Viable IL Rate (£/m²)	£240		

Source: Authors'

Figure D3.2: The distribution of GDV under the three scenarios



Source: Authors'

Model D3 - Interpretation

Minimum threshold

D3.9 The minimum threshold for model D3 is £1,613.

Developer contributions

D3.10 Model D3 shows total developer contributions under the existing system of 15.07% of which 13.88% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 1.19% through CIL and non-affordable housing S106 contributions (the red shaded area).

D3.11 If the IL were set at the hypothetical modelled rate of 50% it would recover 11.6% of the Gross Development Value (the green shaded area), 3.47% less than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that the total exaction achieved under the IL would not be able to secure an equivalent value for investment in affordable housing assuming that policy compliance is achieved under the current regime.

Land values

D3.12 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 13.42% of the total available Gross Development Value. This falls to 2.73% under the existing system and to 5.17% under the proposed IL.

D3.13 Under the existing system, assuming that the affordable housing policy is achieved results in an estimated land value of c. £103,000/ha. This is below the Benchmark Land Value of £200,000/ha. The proposed IL produces a similar result suggesting that the policy-compliant scale of affordable housing would not be viable under either the existing or proposed systems.

D3.14 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model D3 - Sensitivity analyses

Table D3.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA)

Infrastructure Levy	Minimum Threshold (£ /m²)						
	£500	**£750**	**£1,000**	**£1,250**	**£1,500**	**£1,750**	**£2,000**
10%	£302,628	£334,618	£366,607	£398,597	£430,587	£462,577	£494,566
20%	£97,894	£161,873	£225,853	£289,832	£353,812	£417,791	£481,771
30%	-£106,841	-£10,871	£85,098	£181,067	£277,036	£373,006	£468,975
40%	-£311,575	-£183,616	-£55,657	£72,302	£200,261	£328,220	£456,179
50%	-£516,309	-£356,360	-£196,411	-£36,463	£123,486	£283,435	£443,384
60%	-£721,043	-£529,105	-£337,166	-£145,228	£46,711	£238,650	£430,588
70%	-£925,778	-£701,849	-£477,921	-£253,993	-£30,064	£193,864	£417,793
80%	-£1,130,512	-£874,594	-£618,676	-£362,757	-£106,839	£149,079	£404,997

Table D3.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Estimated Land Value Uplift Captured (% of land value uplift)

Infrastructure Levy	Minimum Threshold (£ /m²)						
	£500	**£750**	**£1,000**	**£1,250**	**£1,500**	**£1,750**	**£2,000**
10%	42%	35%	29%	22%	16%	9%	3%
20%	84%	71%	58%	45%	32%	18%	5%
30%	126%	106%	87%	67%	47%	28%	8%
40%	168%	142%	116%	89%	63%	37%	11%
50%	210%	177%	144%	112%	79%	46%	13%
60%	252%	213%	173%	134%	95%	55%	16%
70%	294%	248%	202%	156%	110%	64%	18%
80%	336%	284%	231%	179%	126%	74%	21%

Table D3.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on IL receipt (£/m² of scheme area)

Minimum threshold (/m²)	Levy rate (%)						
	20%	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
£2,000	£20	£30	£40	£50	£60	£70	£80
£1,750	£70	£105	£140	£175	£210	£245	£280
£1,500	£120	£180	£240	£300	£360	£420	£480
£1,250	£170	£255	£340	£425	£510	£595	£680
£1,000	£220	£330	£440	£550	£660	£770	£880
£750	£270	£405	£540	£675	£810	£945	£1,080
£500	£320	£480	£640	£800	£960	£1,120	£1,280

Table D3.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate Sensitivity Table: Impact on land value GDV = £2,100/m²

Base build costs (£ /m²)	Market housing (£ /m²)						
	£1,800	**£1,900**	**£2,000**	**£2,100**	**£2,200**	**£2,300**	**£2,400**
£900	£304,638	£366,058	£427,478	£488,899	£550,319	£611,740	£673,160
£1,000	£220,816	£282,236	£343,657	£405,077	£466,497	£527,918	£589,338
£1,100	£136,994	£198,414	£259,835	£321,255	£382,676	£444,096	£505,516
£1,200	£53,172	£114,592	£176,013	£237,433	£298,854	£360,274	£421,695
£1,300	-£30,650	£30,771	£92,191	£153,611	£215,032	£276,452	£337,873
£1,400	-£114,472	-£53,051	£8,369	£69,790	£131,210	£192,630	£254,051
£1,500	-£198,294	-£136,873	-£75,453	-£14,032	£47,388	£108,809	£170,229

Model D4 - Warehouse scheme

Model inputs

D4.1 Logistics has been one of the best performing commercial real estate sectors over the last decade.

D4.2 Model D4 is premised on a warehouse scheme of 100,000 m² on a 50-hectare greenfield site.

D4.3 In this case study estimated market value/m² was relatively low for distribution uses at £1,729, the low build costs also result in a relatively low Minimum Threshold at £1,043/m².

D4.4 It was estimated that, in the current regime a zero CIL rate was applied to warehouse developments with no S106 contributions.

The Levy rate 'window'

D4.5 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

D4.6 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 54%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model D4 this lower bound estimate value for IL is 0%. Figure D4.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

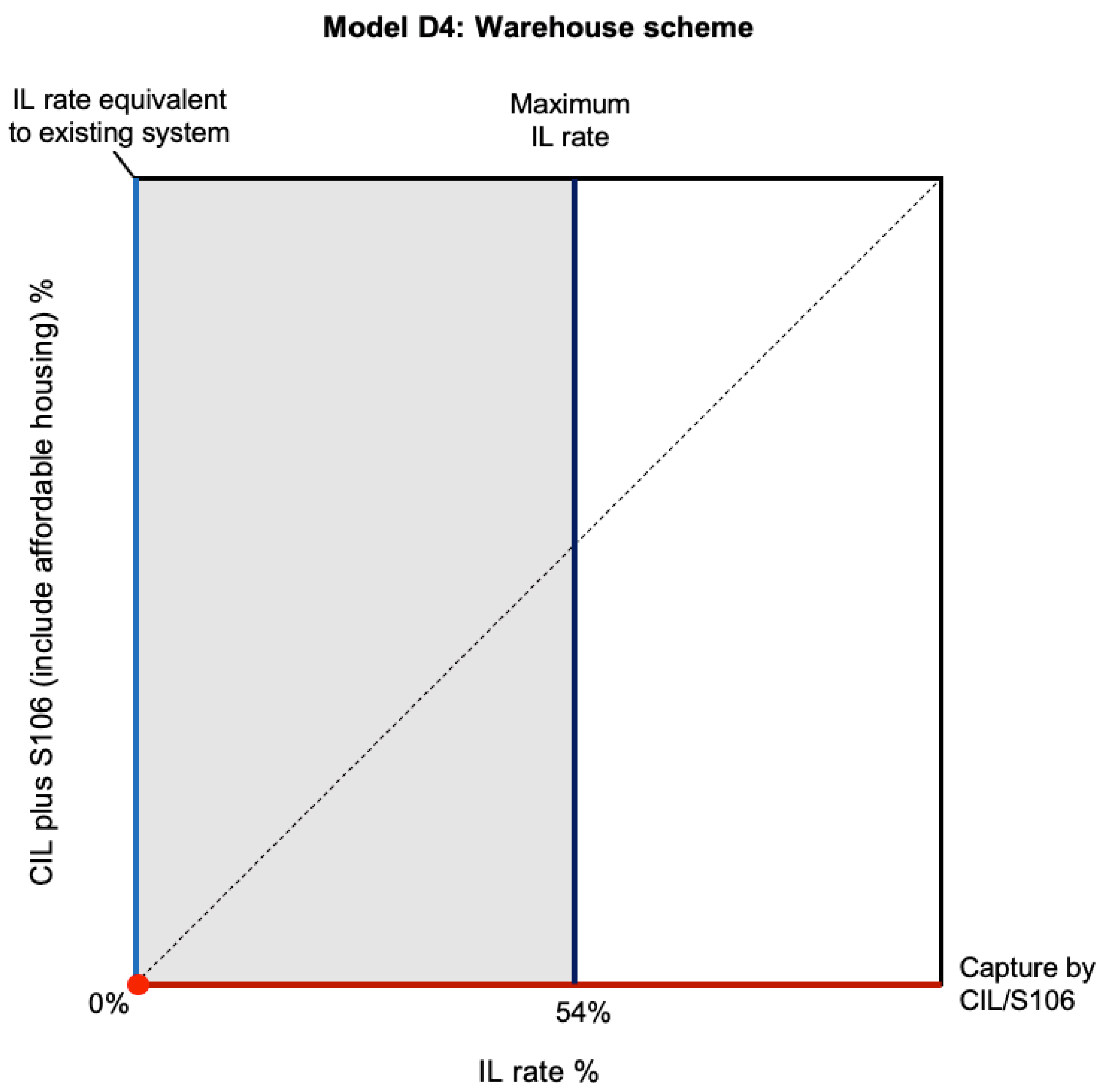
D4.7 In this case there is significant scope for developer contributions above the levels that have been achieved historically under the existing system on a modelled site of this nature, assuming the Benchmark Land Value accurately represents the cost of the land.

Detailed model outputs

D4.8 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model D4 this hypothetical value for the IL is within the upper range of values between the lower and upper bounds. Detailed model outputs are presented in Table D4.1.

D4.9 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure D4.2.

Figure D4.1: IL 'window' diagram for model D4



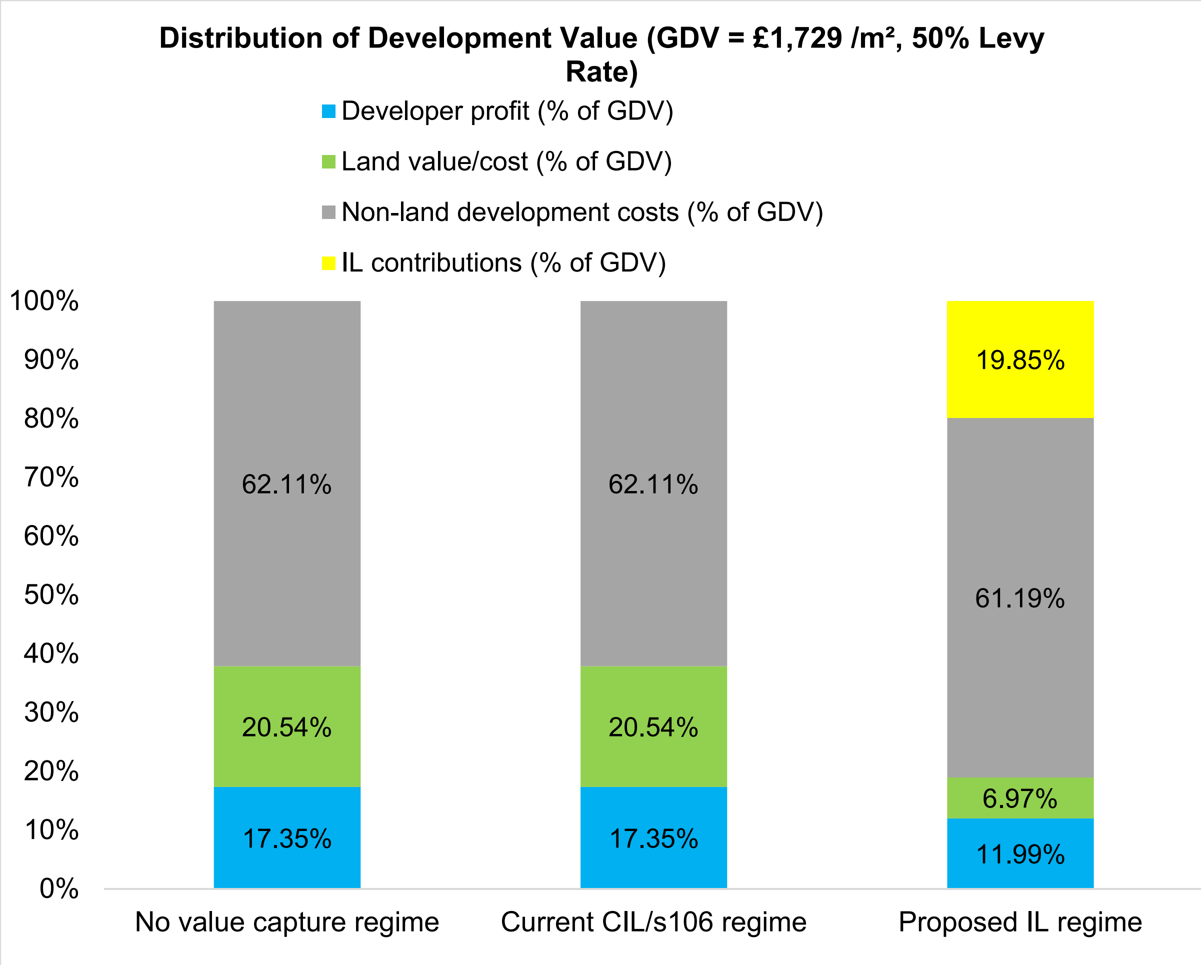
Source: Authors'

Table D4.1: Detailed model outputs for model D4

Key outputs	No LVC	CIL/S106	IL
GDV £/m²	£1,729	£1,729	£1,729
CIL/S106 (£/m² of scheme area)	£0	£0	£0
IL (£ /m² of scheme area)	£0	£0	£343
Estimated land value (£/m² of NDA)	£71	£71	£24
Estimated land value (£/ha NDA)	£710,426	£710,426	£240,939
Estimated land value (£/ha GDA)	£710,426	£710,426	£240,939
Estimated total uplift above EUV (£/m² of NDA)	£69	£69	£22
Land value uplift captured (£/m² of NDA)	£0	£0	£47
% total uplift captured	0%	0.00%	68.00%
Total developer investment (£)	£141,215,801	£141,215,801	£116,145,189
Estimated developer profit from project (£)	£30,004,389	£30,004,389	£20,740,157
Developer profit (£/m² of scheme area)	£300	£300	£207
Profit margin (% of GDV)	17.35%	17.35%	11.99%
Profit margin (% of development costs)	20.99%	20.99%	13.70%
ROCE	21.25%	21.25%	17.86%
Equity multiple	1.21	1.21	1.18
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	0%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£0		
Maximum Viable IL Rate (%)	54%		
Maximum Viable IL Rate (£/m²)	£373		

Source: Authors’

Figure D4.2: The distribution of GDV under the three scenarios



Source: Authors'

Model D4 - Interpretation

Minimum threshold

D4.9 The minimum threshold for model D4 is £1,043/m².

Developer contributions

D4.10 Model D4 shows total developer contributions under the existing system of 0% as developer contributions are not typically received on a scheme of this type.

D4.11 If set at the modelled rate of 50% the IL would recover 19.85% of the Gross Development Value (the green shaded area).

Land values

D4.12 Land values are diminished as result of the imposition of any system of developer contributions. In the policy-free scenario land values account of 20.54% of the total available Gross Development Value. This remains at 20.54% under the existing system and falls to 6.97% under the proposed IL.

D4.13 It was estimated that the land value per hectare is £710,000 in the absence of developer contributions.

D4.14 At the nominal modelled rate of IL of 50% the estimated land value falls to c. £241,000 per hectare, still above the Benchmark Land Value of £200,000.

D4.15 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model D4 - Sensitivity analyses

Table D4.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA)

		Minimum Threshold (£ /m²)						
		£600	£700	£800	£900	£1,000	£1,100	£1,200
Infrastructure Levy	10%	£555,981	£569,655	£583,328	£597,002	£610,676	£624,350	£638,024
	20%	£401,536	£428,884	£456,231	£483,579	£510,926	£538,274	£565,621
	30%	£247,091	£288,112	£329,134	£370,155	£411,176	£452,198	£493,219
	40%	£92,646	£147,341	£202,036	£256,731	£311,427	£366,122	£420,817
	50%	-£61,799	£6,570	£74,939	£143,308	£211,677	£280,046	£348,415
	60%	-£216,244	-£134,201	-£52,158	£29,884	£111,927	£193,970	£276,012
	70%	-£370,689	-£274,972	-£179,256	-£83,539	£12,177	£107,894	£203,610
	80%	-£525,134	-£415,743	-£306,353	-£196,963	-£87,573	£21,818	£131,208

Table D4.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Estimated Land Value Uplift Captured (% of land value uplift)

		Minimum Threshold (£ /m²)						
		£600	£700	£800	£900	£1,000	£1,100	£1,200
Infrastructure Levy	10%	22%	20%	18%	16%	14%	12%	10%
	20%	45%	41%	37%	33%	29%	25%	21%
	30%	67%	61%	55%	49%	43%	37%	31%
	40%	89%	82%	74%	66%	58%	50%	42%
	50%	112%	102%	92%	82%	72%	62%	52%
	60%	134%	122%	110%	99%	87%	75%	63%
	70%	157%	143%	129%	115%	101%	87%	73%
	80%	179%	163%	147%	131%	116%	100%	84%

Table D4.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on IL receipt (£/m² of scheme area) GDV = £1,729 /m²

Minimum threshold (/m²)	Levy rate (%)						
	20%	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
£2,500	£0	£0	£0	£0	£0	£0	£0
£2,250	£0	£0	£0	£0	£0	£0	£0
£2,000	£0	£0	£0	£0	£0	£0	£0
£1,750	£0	£0	£0	£0	£0	£0	£0
£1,500	£46	£69	£92	£115	£138	£161	£184
£1,250	£96	£144	£192	£240	£288	£336	£384
£1,000	£146	£219	£292	£365	£438	£511	£584

Table D4.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA, 50% Levy Rate)

Base build costs (£ /m²)	GDV (£ /m²)						
	£1,450	**£1,550**	**£1,650**	**£1,750**	**£1,850**	**£1,950**	**£2,050**
£500	£366,539	£433,540	£500,542	£567,543	£634,545	£701,546	£768,548
£600	£254,800	£321,802	£388,804	£455,805	£522,807	£589,808	£656,810
£700	£143,062	£210,064	£277,065	£344,067	£411,068	£478,070	£545,071
£800	£31,324	£98,325	£165,327	£232,328	£299,330	£366,331	£433,333
£900	-£80,414	-£13,413	£53,589	£120,590	£187,592	£254,593	£321,595
£1,000	-£192,153	-£125,151	-£58,150	£8,852	£75,853	£142,855	£209,856
£1,100	-£303,891	-£236,890	-£169,888	-£102,886	-£35,885	£31,117	£98,118
£1,200	-£415,629	-£348,628	-£281,626	-£214,625	-£147,623	-£80,622	-£13,620

Case Study E: Rural England

E1.1 Case Study E has a median house price in the region of £190,000 per dwelling and has seen house prices rising steadily year on year recently. Median incomes in the authority are in the region of £30,000 and have been increasing in recent years. The affordability ratio of median incomes to median house prices has remained stable at around 6.

E1.2. For Case Study E over the five-year period 2016-2020, the scale of new housing delivered has been, on average approximately, 1,100 dwellings per annum. As year-on-year household growth has been averaging approximately 1,000 more households per year, recent housing delivery is about 120% of what household growth in the local authority would suggest is required.

E1.3 In order to estimate new build house prices in local authority Case Study E we take land registry price paid data and apply a local authority-specific uplift to reflect the locally specific premium paid for new builds in comparison to the secondary market for new dwellings. For Case Study E this premium is 22.48% and is used to compute the values set out in Table E1.1. It should also be noted that the land registry price paid data excludes all categories of affordable housing, the sale of right-to-buy properties, transfers and actions resulting from the enactment of Compulsory Purchase Order powers and court orders.

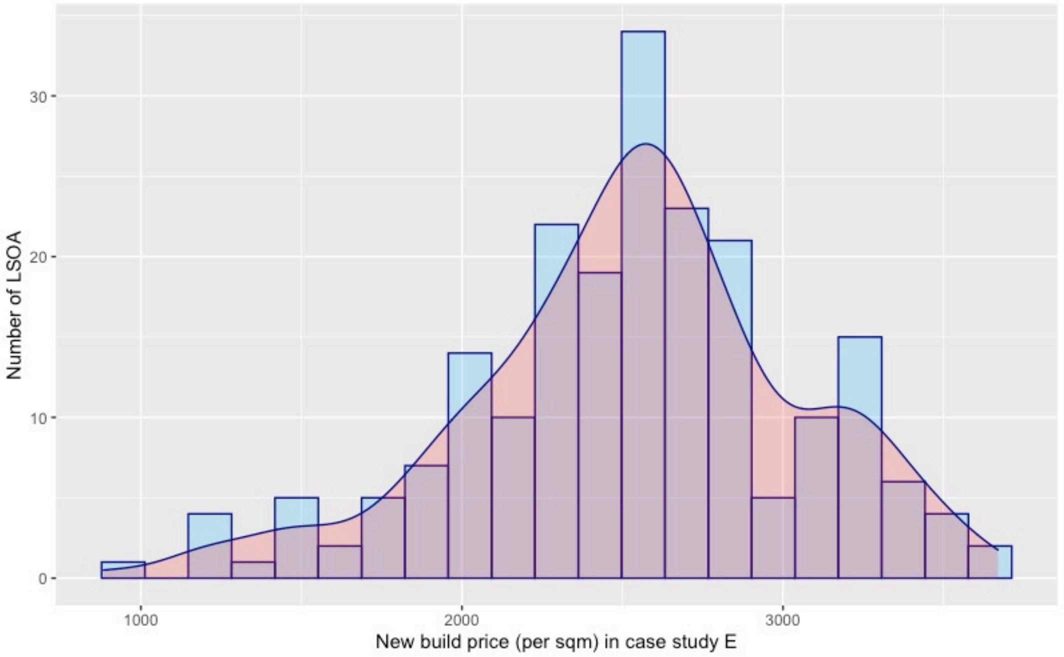
E1.4 Case Study E is also a heterogeneous new build housing market. New build house prices vary between approximately £900/m² and £3,700/m² across the full extent of the LSOAs that comprise the local authority. Development values for new build house prices vary by a factor of approximately 4 across Case Study E. Summary statistics on the variability in new build residential prices is contained in Table E1.1 and Figure E1.1.

Table E1.1: Approximate new build house prices in Case Study E (2020)

House price	Average	1st quartile	Median	3rd quartile
New Build	270,000	174,000	233,000	330,000
New Build £/m²	2,600	2,100	2,600	3,000

Source: Authors' calculations from HMLR 'price paid' data

Figure E1.1: Approximate new build house prices in Case Study E by LSOA (2020)



Source: Authors' calculations from HMLR 'price paid' data

Affordable housing, planning obligations and CIL

E1.5 Case Study E is not a CIL-charging authority.

E1.6 Local planning policy states that up to 25% of private developments (over 10 units) will be affordable housing. The Case Study is not a CIL charging authority.

E1.7 In recent years the case study has had over 1,000 planning applications submitted each year, with an average of around 500 for residential developments per annum.

Model outputs for Case Study E

E1.8 This local authority is a member of the Rural England family.

E1.9 The local authority requested three residential schemes and a distribution-led scheme to be modelled – all in greenfield settings. The three residential developments are all low-density schemes in respectively higher (Model E1), median (Model E2) and lower (Model E3) value settings.

E1.10 As this local authority does not charge CIL all developer contributions were modelled through S106 agreements of varying rates to reflect local authority expectations in different market settings. The local authority also specified varying affordable housing contributions for each model.

Model E1 - Residential development (upper quartile house price = £2,900/m²)

Model inputs

E1.11 Model E1 is a greenfield development on a five-hectare site (gross development area) in a higher value setting providing a mixture of low-density apartments and single-family homes.

E1.12 The local authority specified an affordable housing requirement of 22.5% of which 25% should be First Homes, 22.5% social rented, 42.5% affordable rented and 10% in an intermediate tenure.

E1.13 As the local authority does not levy CIL developer contributions were modelled based on local authority expectations of £7,500 per dwelling.

The Levy rate 'window'

E1.14 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

E1.15 Assuming a Benchmark Land Value of £200,000/ha of gross developable area it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 88%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model E1 this lower bound estimate value for IL is 32%. Figure E1.2 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

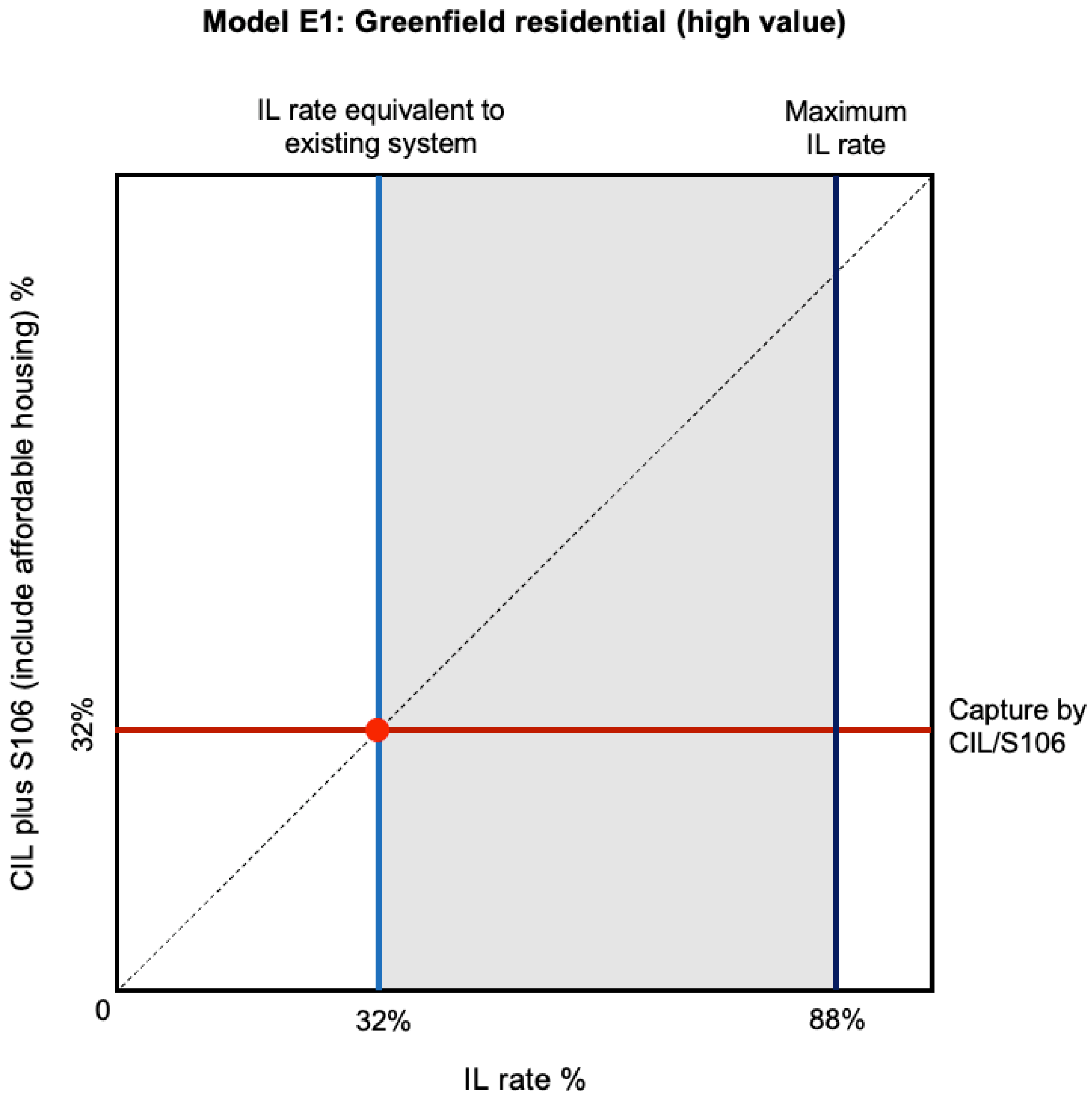
E1.16 In this case there is significant scope for developer contributions above the levels that have been achieved historically under the existing system on a modelled site of this nature, assuming the Benchmark Land Value accurately represents the cost of the land.

Detailed model outputs

E1.17 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model E1 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table E1.2.

E1.18 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure E1.3.

Figure E1.2: IL 'window' diagram for model E1



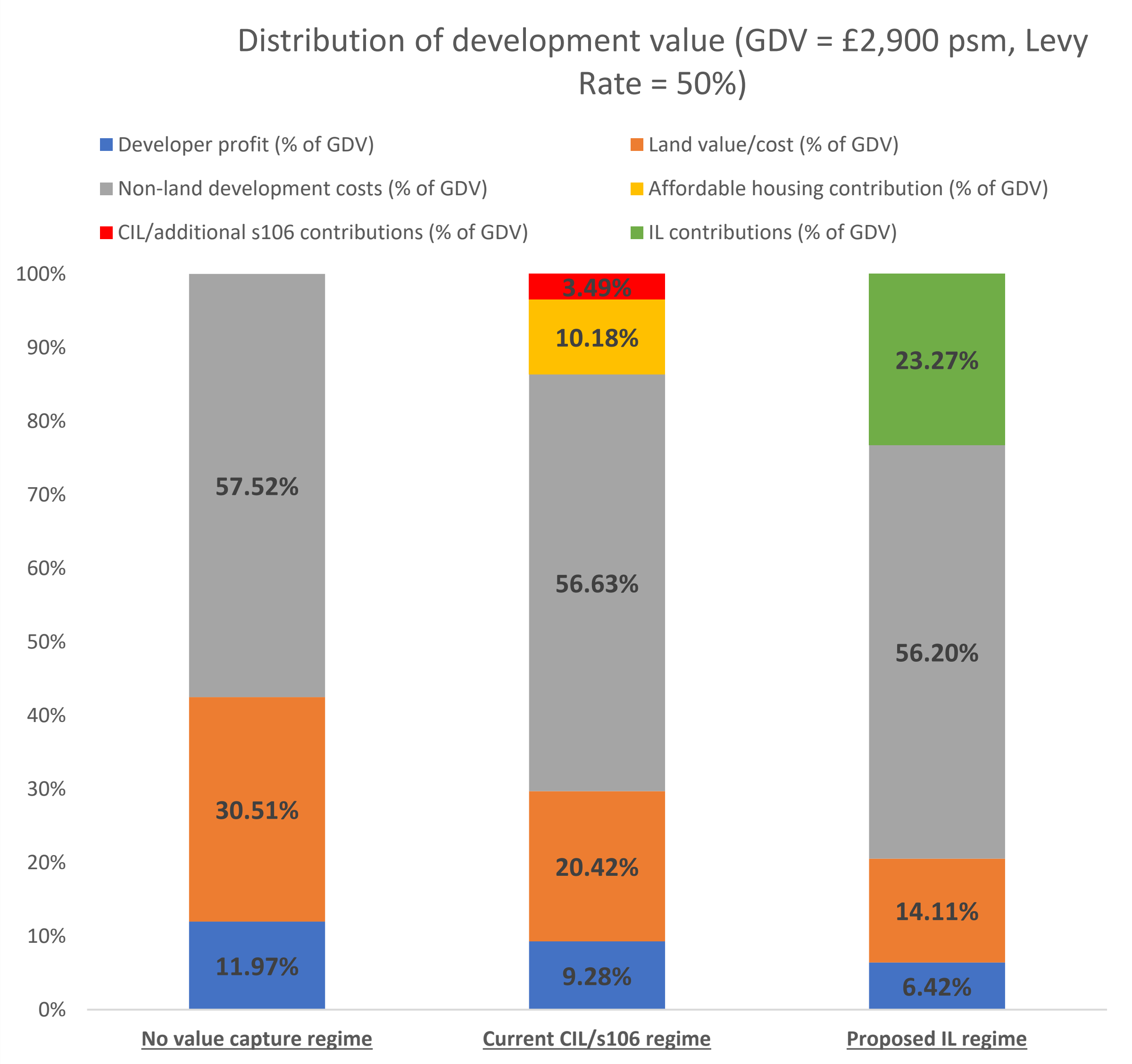
Source: Authors'

Table E1.2: Detailed model outputs for model E1

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before affordable housing discounts)	£2,900	£2,900	£2,900
Value of affordable housing discount (£/m² of scheme area)	£0	£305	£305
CIL/S106 (£ /m² of scheme area)	£0	£101	£0
Gross IL (£ /m² of scheme area)	£0	£0	£675
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£369
Affordable housing discounts as a % of value capture	n/a	75%	45%
Estimated land value (£/m² of NDA)	£286	£196	£144
Estimated land value (£/ha NDA)	£2,863,098	£1,964,432	£1,436,744
Estimated land value (£/ha GDA)	£1,717,859	£1,178,659	£862,046
Estimated total land value uplift above EUV (£/m² of NDA)	£283	£193	£140
Land value uplift captured (£/m² of NDA)	£0	£90	£143
% total uplift captured	0%	31.76%	50.41%
Total developer investment (£)	£11,238,458	£9,269,130	£6,668,419
Estimated developer profit from project (£)	£3,336,604	£2,611,976	£1,887,292
Developer profit (£ /m² of scheme area)	£371	£290	£210
Profit margin (% of GDV)	12.36%	10.77%	7.78%
Profit margin (% of development costs)	14.10%	12.07%	8.55%
ROCE	29.69%	28.18%	28.30%
Equity multiple	1.30	1.28	1.28
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	32%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£427		
Maximum Viable IL Rate (%)	88%		
Maximum Viable IL Rate (£/m²)	£1,192		

Source: Authors'

Figure E1.3: The distribution of GDV under the three scenarios



Source: Authors'

Model E1 - Interpretation

Minimum threshold

E1.19 The minimum threshold for model E1 is £1,550/m².

Developer contributions

E1.20 Model E1 shows total developer contributions under the existing system of 13.67%of which 10.18% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 3.49% through non-affordable housing S106 contributions (the red shaded area).

E1.21 If set at the modelled rate of 50% the IL would recover 23.27% of the Gross Development Value (the green shaded area), 9.6% greater than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL, 10.18% of GDV would go to maintaining levels of affordable housing, leaving 13.09% of GDV available for infrastructure and public goods.

Land values

E1.22 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 30.51% of the total available Gross Development Value. This falls to 20.42% under the existing system and to 14.11 % under the IL if set at the modelled rate of 50%.

E1.23 Under the current system the land value reduction suggests that around £0.9 million of the land value is being captured representing a reduction of c. 31% of the land value estimate with zero developer contributions.

E1.24 The modelled rate of IL suggests that around £1.4 million of the land value would be captured. This represents a reduction of c50% compared to the land value estimated assuming zero developer contributions.

E1.25 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs

Model E1 - Sensitivity analyses

Table E1.3: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA)

		Minimum Threshold (£ /m²)						
		£1,300	**£1,400**	**£1,500**	**£1,600**	**£1,700**	**£1,800**	**£1,900**
Infrastructure Levy	**10%**	£1,520,941	£1,533,737	£1,546,533	£1,559,328	£1,572,124	£1,584,920	£1,597,716
	20%	£1,316,206	£1,341,798	£1,367,390	£1,392,982	£1,418,574	£1,444,165	£1,469,757
	30%	£1,111,472	£1,149,860	£1,188,247	£1,226,635	£1,265,023	£1,303,410	£1,341,798
	40%	£906,737	£957,921	£1,009,105	£1,060,288	£1,111,472	£1,162,655	£1,213,839
	50%	£702,003	£765,982	£829,962	£893,941	£957,921	£1,021,900	£1,085,880
	60%	£497,268	£574,044	£650,819	£727,595	£804,370	£881,145	£957,921
	70%	£292,534	£382,105	£471,677	£561,248	£650,819	£740,391	£829,962
	80%	£87,799	£190,167	£292,534	£394,901	£497,268	£599,636	£702,003

Table E1.4: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Estimated Land Value Uplift Captured (%)

		Minimum Threshold (£ /m²)						
		£1,300	**£1,400**	**£1,500**	**£1,600**	**£1,700**	**£1,800**	**£1,900**
Infrastructure Levy	**10%**	12%	11%	10%	9%	9%	8%	7%
	20%	24%	22%	21%	19%	18%	16%	15%
	30%	36%	33%	31%	29%	27%	24%	22%
	40%	48%	45%	42%	39%	36%	33%	30%
	50%	60%	56%	52%	49%	45%	41%	37%
	60%	72%	67%	63%	58%	54%	49%	45%
	70%	84%	79%	73%	68%	63%	58%	52%
	80%	96%	90%	84%	78%	72%	66%	60%

Table E1.5: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on IL receipt (£ /m² of scheme area)

Minimum threshold	Levy rate (%)						
	20%	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
£1,300	£320	£480	£640	£800	£960	£1,120	£1,280
£1,400	£300	£450	£600	£750	£900	£1,050	£1,200
£1,500	£280	£420	£560	£700	£840	£980	£1,120
£1,600	£260	£390	£520	£650	£780	£910	£1,040
£1,700	£240	£360	£480	£600	£720	£840	£960
£1,800	£220	£330	£440	£550	£660	£770	£880
£1,900	£200	£300	£400	£500	£600	£700	£800

Table E1.6: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£ /ha GDA)

Base build costs (£ /m²)	Market housing values (£ /m²)						
	£2,400	**£2,600**	**£2,800**	**£3,000**	**£3,200**	**£3,400**	**£3,600**
£900	£1,352,171	£1,353,451	£1,354,730	£1,356,010	£1,357,290	£1,358,569	£1,359,849
£1,000	£1,325,996	£1,331,114	£1,336,232	£1,341,351	£1,346,469	£1,351,587	£1,356,706
£1,100	£1,256,314	£1,267,830	£1,279,347	£1,290,863	£1,302,379	£1,313,896	£1,325,412
£1,200	£1,143,127	£1,163,600	£1,184,073	£1,204,547	£1,225,020	£1,245,494	£1,265,967
£1,300	£986,433	£1,018,423	£1,050,412	£1,082,402	£1,114,392	£1,146,382	£1,178,372
£1,400	£786,233	£832,299	£878,364	£924,429	£970,494	£1,016,560	£1,062,625
£1,500	£542,528	£605,228	£667,928	£730,628	£793,328	£856,028	£918,727
£1,600	£255,316	£337,210	£419,104	£500,998	£582,891	£664,785	£746,679

Model E2 - Residential development (median house price = £2,350/m²)

Model inputs

E2.1 Model E2 is a greenfield development on a five-hectare site (gross development area) in a median value setting providing a mixture of low-density apartments and single-family homes.

E2.2 The local authority specified an affordable housing requirement of 15% of which 25% should be First Homes, 25% social rented and 50% affordable rented.

E2.3 As the local authority does not levy CIL developer contributions were modelled based on local authority expectations of £1,700 per dwelling.

The Levy rate 'window'

E2.4 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

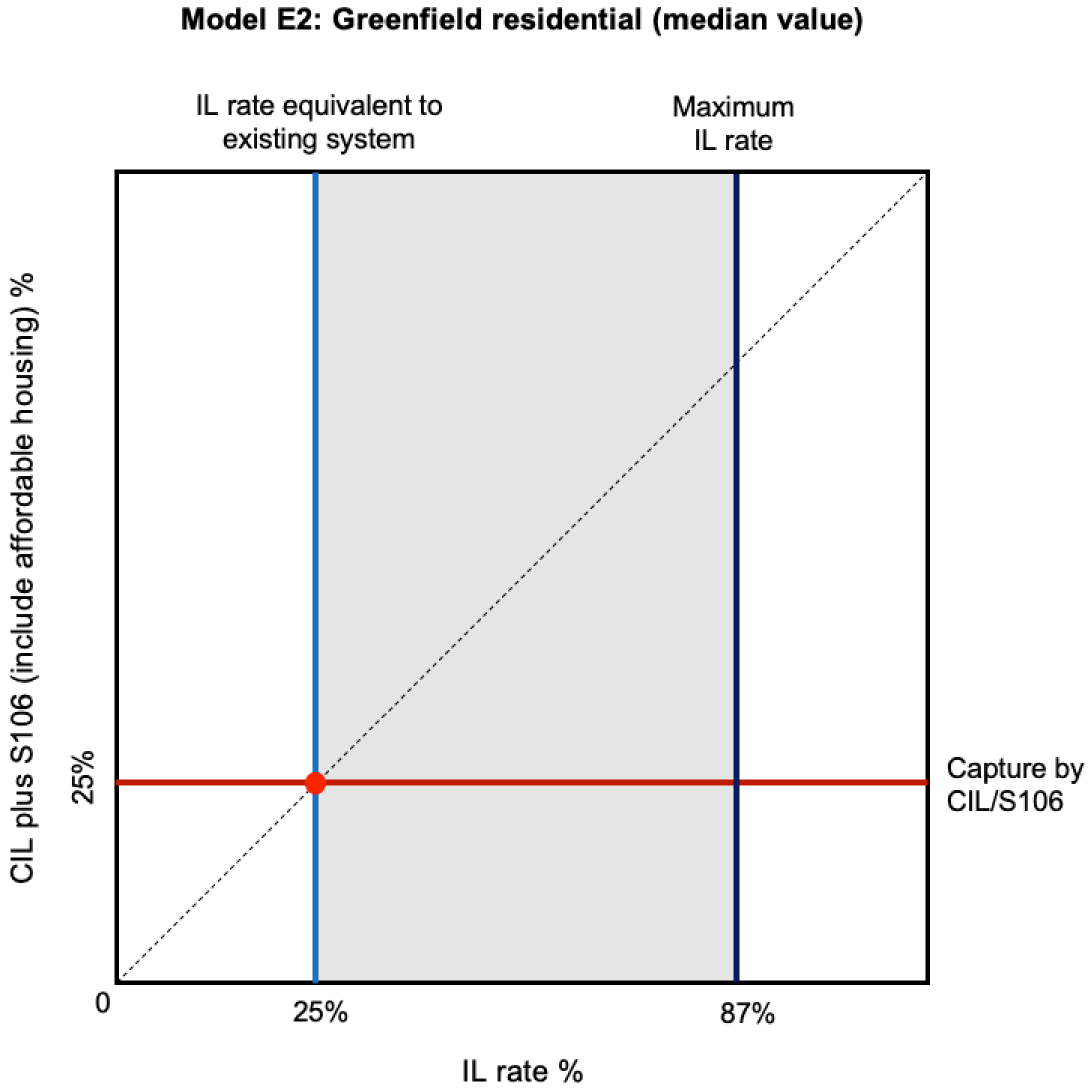
E2.5 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 87%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model E2 this lower bound estimate value for IL is 25%. Figure E2.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

E2.6 In this case there is scope for developer contributions - although less than in the higher value setting represented by Model E1. It is worth noting that the principal explanatory feature in accounting for the differential performance of the IL is development values.

Detailed model outputs

E2.7 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model E2 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table E2.2.

Figure E2.1: IL 'window' diagram for model E2



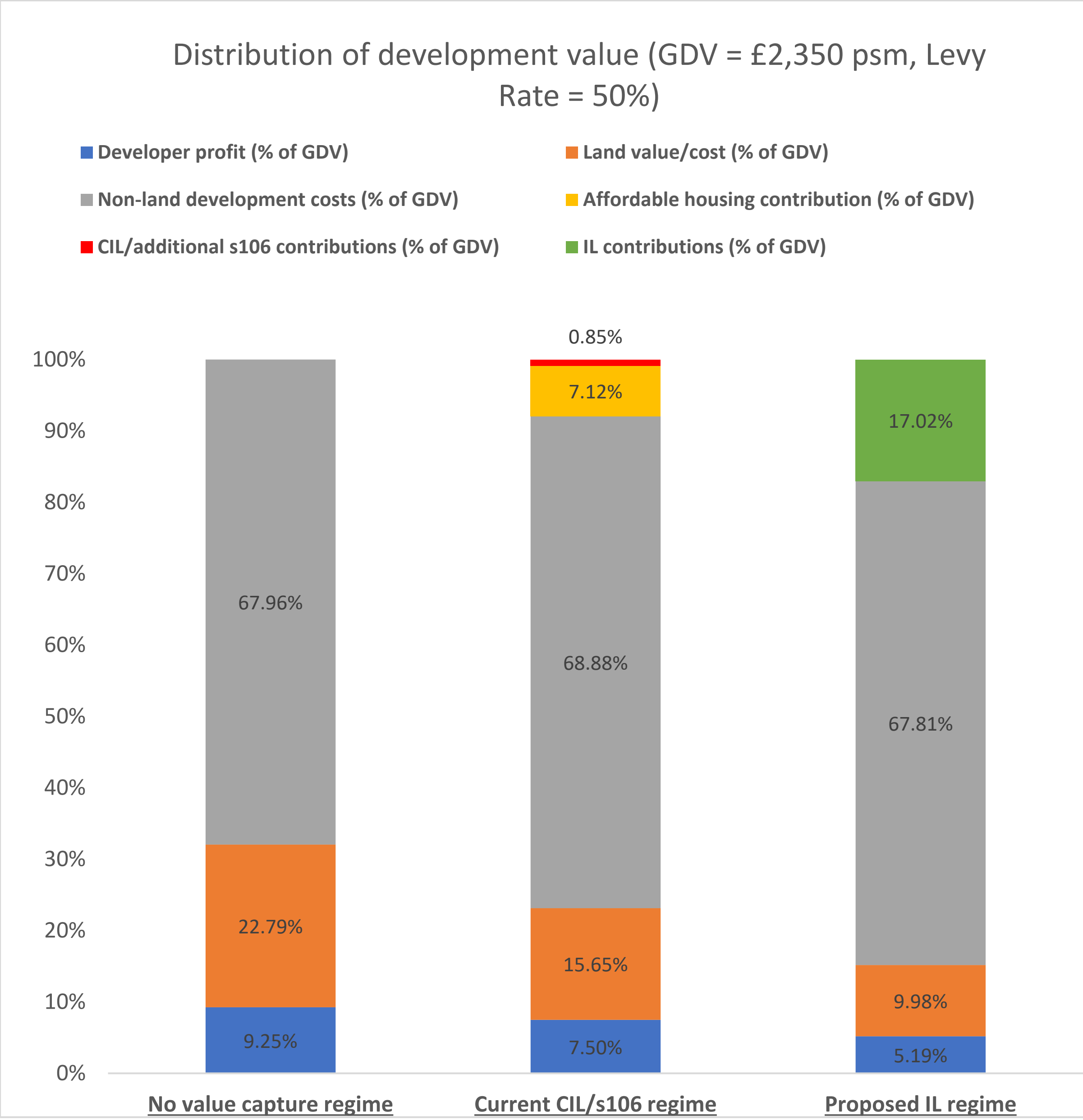
Source: Authors'

Table E2.2: Detailed model outputs for Model E2

Key outputs	**No LVC**	**CIL/S106**	**IL**
GDV £/m² (before affordable housing discounts)	£2,350	£2,350	£2,350
Value of affordable housing discount (£/m² of scheme area)	£0	£178	£178
CIL/S106 (£/m² of scheme area)	£0	£20	£0
Gross IL (£/m² of scheme area)	£0	£0	£400
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£222
Affordable housing discounts as a % of value capture	n/a	90%	31%
Estimated land value (£/m² of NDA)	£182	£139	£97
Estimated land value (£/ha NDA)	£1,818,099	£1,394,330	£972,774
Estimated land value (£/ha GDA)	£1,090,860	£836,598	£583,665
Estimated total uplift above EUV (£/m² of NDA)	£178	£136	£94
Land value uplift captured (£/m² of NDA)	£0	£42	£85
% total uplift captured	0%	23.74%	47.36%
Total developer investment (£)	£7,890,282	£6,712,525	£5,181,860
Estimated developer profit from project (£)	£2,274,785	£1,881,481	£1,415,854
Developer profit (£/m² of scheme area)	£253	£209	£157
Profit margin (% of GDV)	10.11%	9.00%	6.78%
Profit margin (% of development costs)	11.25%	9.89%	7.34%
ROCE	28.83%	28.03%	27.32%
Equity multiple	1.29	1.28	1.27
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	25%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£202		
Maximum Viable IL Rate (%)	87%		
Maximum Viable IL Rate (£/m²)	£700		

Source: Authors’

Figure E2.2: The distribution of GDV under the three scenarios



Source: Authors'

Model E2 - Interpretation

Minimum threshold

E2.8 The minimum threshold for model E2 is £1,550/m².

Developer contributions

E2.9 Model E2 shows total developer contributions under the existing system of 7.97% of which 7.12% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 0.85% through CIL and non-affordable housing S106 contributions (the red shaded area).

E2.10 If set at the modelled rate of 50% the IL would recover 17.02% of the Gross Development Value (the green shaded area), 9.05% greater than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL, 7.12% of GDV would go to maintaining levels of affordable housing, leaving 9.9% of GDV available for infrastructure and public goods.

Land values

E2.11 Land values are diminished as result of the imposition of any system of developer contributions. In the policy-free scenario land values account of 22.79% of the total available Gross Development Value. This falls to 15.65% under the existing system and to 9.98% under the IL at the modelled rate of 50%.

E2.12 The land value reduction suggests that the existing system captures around £0.4 million of the land value, representing a reduction of 23% of the land value estimate with zero developer contributions.

E2.13 For the IL scenario set at the hypothetical rate of 50%, the estimated land value would be £584,000/ha of gross developable area. The required developer's profit is estimated at £1.41 million for a required equity investment of £5.18 million producing an estimated Return on Capital Employed of just over 27%.

E2.14 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model E2 - Sensitivity Analyses

Table E2.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA)

		Minimum Threshold (£ /m²)						
		£1,300	**£1,400**	**£1,500**	**£1,600**	**£1,700**	**£1,800**	**£1,900**
Infrastructure Levy	**10%**	£961,061	£973,857	£986,653	£999,449	£1,012,245	£1,025,040	£1,037,836
	20%	£826,704	£852,296	£877,888	£903,479	£929,071	£954,663	£980,255
	30%	£692,347	£730,735	£769,122	£807,510	£845,898	£884,285	£922,673
	40%	£557,990	£609,173	£660,357	£711,541	£762,724	£813,908	£865,092
	50%	£423,633	£487,612	£551,592	£615,571	£679,551	£743,530	£807,510
	60%	£289,276	£366,051	£442,827	£519,602	£596,378	£673,153	£749,928
	70%	£154,919	£244,490	£334,062	£423,633	£513,204	£602,776	£692,347
	80%	£20,562	£122,929	£225,296	£327,664	£430,031	£532,398	£634,765

Table E2.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Estimated Land Value Uplift Captured (%)

		Minimum Threshold (£ /m²)						
		£1,300	**£1,400**	**£1,500**	**£1,600**	**£1,700**	**£1,800**	**£1,900**
Infrastructure Levy	**10%**	12%	11%	10%	9%	7%	6%	5%
	20%	25%	22%	20%	17%	15%	13%	10%
	30%	37%	34%	30%	26%	23%	19%	16%
	40%	50%	45%	40%	35%	31%	26%	21%
	50%	62%	56%	50%	44%	38%	32%	26%
	60%	75%	68%	61%	53%	46%	39%	32%
	70%	87%	79%	71%	62%	54%	46%	37%
	80%	100%	90%	81%	71%	62%	52%	43%

Table E2.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on IL receipt (£ /m² of scheme area)

Minimum threshold (/m²)	Levy rate (%)						
	20%	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
£1,300	£210	£315	£420	£525	£630	£735	£840
£1,400	£190	£285	£380	£475	£570	£665	£760
£1,500	£170	£255	£340	£425	£510	£595	£680
£1,600	£150	£225	£300	£375	£450	£525	£600
£1,700	£130	£195	£260	£325	£390	£455	£520
£1,800	£110	£165	£220	£275	£330	£385	£440
£1,900	£90	£135	£180	£225	£270	£315	£360

Table E2.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£ /ha GDA)

Base build costs (£ /m²)	Market housing values (£ /m²)						
	£2,200	**£2,300**	**£2,400**	**£2,500**	**£2,600**	**£2,700**	**£2,800**
£900	£458,384	£583,966	£709,548	£835,130	£960,712	£1,086,295	£1,211,877
£1,000	£374,562	£500,144	£625,726	£751,308	£876,891	£1,002,473	£1,128,055
£1,100	£290,740	£416,322	£541,904	£667,486	£793,069	£918,651	£1,044,233
£1,200	£206,918	£332,500	£458,082	£583,665	£709,247	£834,829	£960,411
£1,300	£123,096	£248,678	£374,261	£499,843	£625,425	£751,007	£876,589
£1,400	£39,274	£164,856	£290,439	£416,021	£541,603	£667,185	£792,767
£1,500	-£44,548	£81,035	£206,617	£332,199	£457,781	£583,363	£708,946
£1,600	-£128,369	-£2,787	£122,795	£248,377	£373,959	£499,542	£625,124

Model E3 - Residential development (lower quartile house price = £1,800/m²)

Model inputs

E3.1 Model E3 is a greenfield development on a five-hectare site (gross development area) in a lower value setting providing a mixture of low-density apartments and single-family homes.

E3.2 The local authority specified an identical affordable housing requirement of 5% affordable housing of which 25% should be First Homes, 25% social rented and 50% affordable rented.

E3.3 As the local authority does not levy CIL all developer contributions are modelled through S106 set at £1200 per dwelling.

The Levy rate 'window'

E3.4 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

E3.5 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 83%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model E3 this lower bound estimate value for IL is 25%. Figure E3.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

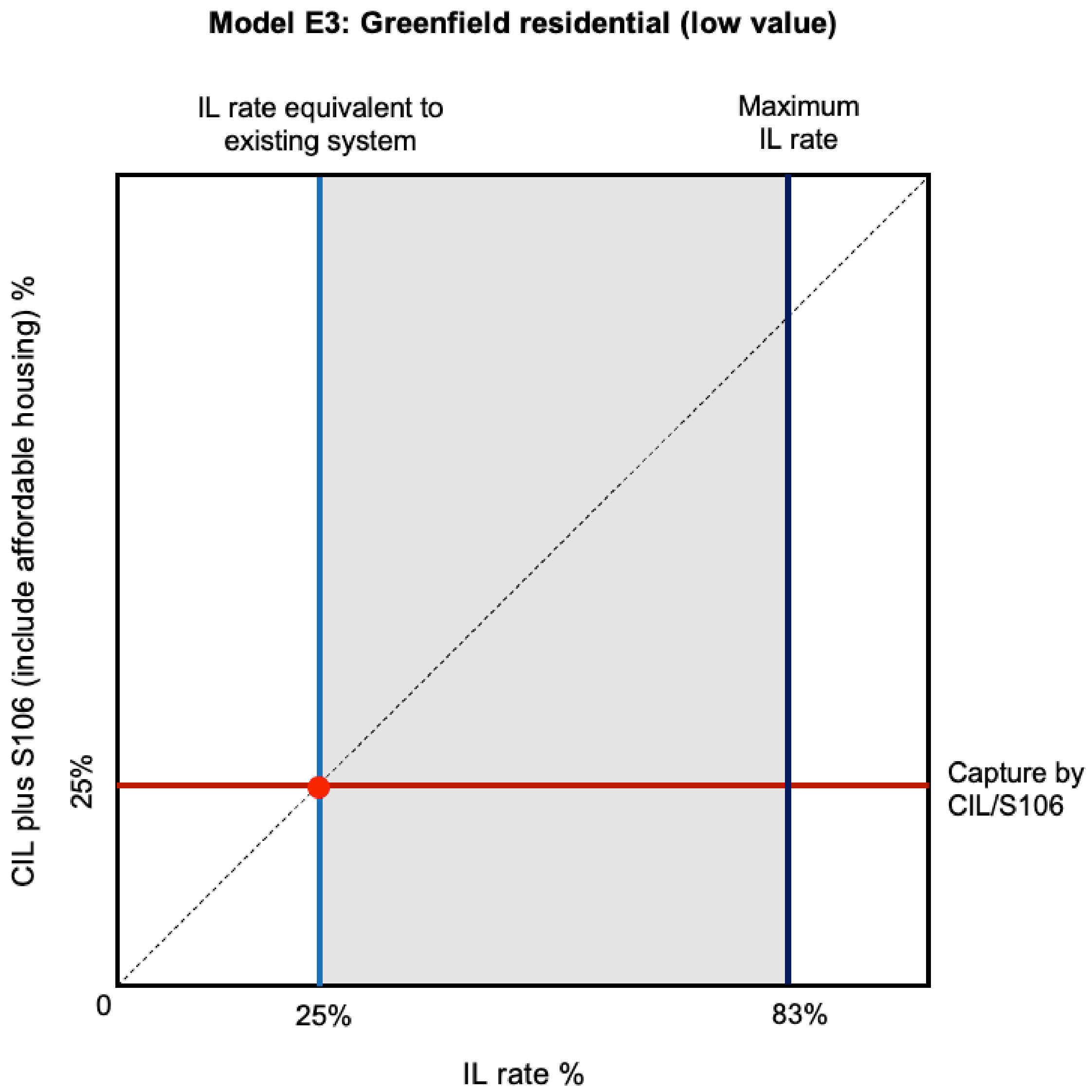
E3.6 In this case there is scope for developer contributions - although less than in the higher value settings represented by Models E1and E2. It is worth noting that the principal explanatory feature in accounting for the differential performance of the IL is development values.

Detailed model outputs

E3.7 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model E3 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table E3.1.

E3.8 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure E3.2.

Figure E3.1: IL 'window' diagram for model E3



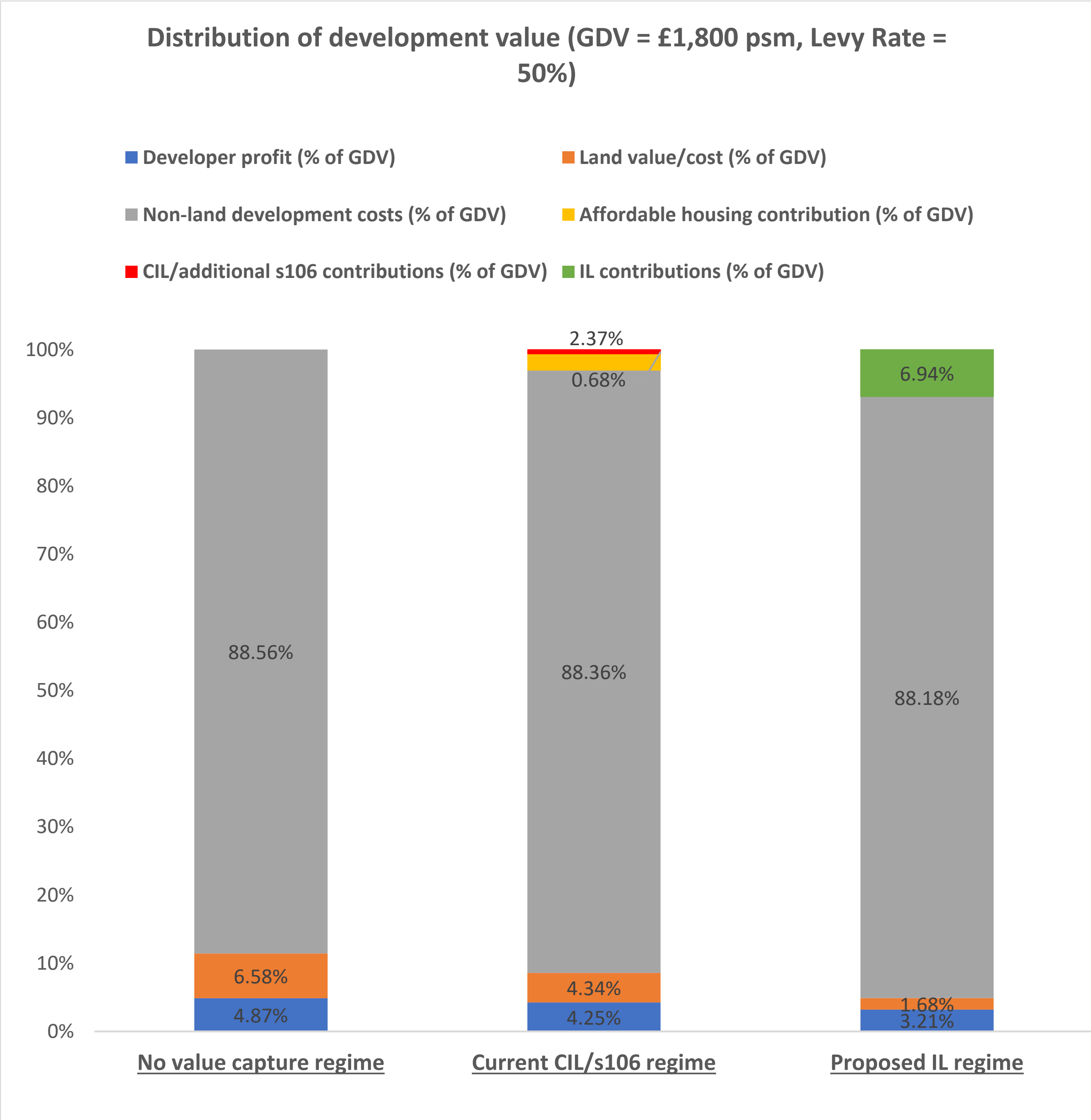
Source: Authors'

Table E3.1: Detailed model outputs for model E3

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before affordable housing discounts)	£1,800	£1,800	£1,800
Value of affordable housing discount (£ /m² of scheme area)	£0	£47	£47
CIL/S106 (£/m² of scheme area)	£0	£12	£0
Gross IL (£/m² of scheme area)	£0	£0	£125
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£77
Affordable housing discounts as a % of value capture	n/a	80%	38%
Estimated land value (£/m² of NDA)	£77	£64	£51
Estimated land value (£/ha NDA)	£773,100	£642,360	£508,663
Estimated land value (£/ha GDA)	£463,860	£385,416	£305,198
Estimated total uplift above EUV (£ /m² of NDA)	£74	£61	£48
Land value uplift captured (£/m² of NDA)	£0	£13	£26
% total uplift captured	0%	17.67%	35.75%
Total developer investment (£)	£4,542,105	£4,233,214	£3,694,849
Estimated developer profit from project (£)	£1,212,966	£1,102,908	£944,273
Developer profit (£/m² of scheme area)	£135	£123	£105
Profit margin (% of GDV)	6.74%	6.28%	5.37%
Profit margin (% of development costs)	7.23%	6.70%	5.71%
ROCE	26.70%	26.05%	25.56%
Equity multiple	1.27	1.26	1.26
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	25%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£62		
Maximum Viable IL Rate (%)	83%		
Maximum Viable IL Rate (£/m²)	£207		

Source: Authors'

Figure E3.2: The distribution of GDV under the three scenarios



Source: Authors'

Model E3 – Interpretation

Minimum threshold

E3.9 The minimum threshold for model E3 is £1,550/m².

Developer contributions

E3.10 Model E3 shows total developer contributions under the existing system of 3.05% of which 0.68% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 2.37% through CIL and non-affordable housing S106 contributions (the red shaded area).

E3.11 If set at the modelled rate of 50% the IL would recover 6.94% of the Gross Development Value (the green shaded area),3.89% more than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL,0.68% of GDV would go to maintaining levels of affordable housing, leaving 6.26% of GDV available for infrastructure and public goods.

Land values

E3.12 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 6.58% of the total available Gross Development Value. This falls to 4.34% under the existing system and to 1.68% under the proposed IL.

E3.13 The land value reduction suggests that the existing system captures around £0.1 million of the land value, representing a reduction of c. 17% of the land value estimate with zero developer contributions.

E3.14 For the IL scenario at the hypothetical modelled rate of 50%, the estimated land value is £305198/ha of gross developable area. The required developer's profit is estimated at c. £944000 for a required equity investment of £3.69 million producing an estimated Return on Capital Employed of over 25%.

E3.15 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model E3 - Sensitivity analyses

Table E3.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha NDA)

		Minimum Threshold (£ /m²)						
		£1,300	**£1,400**	**£1,500**	**£1,600**	**£1,700**	**£1,800**	**£1,900**
Infrastructure Levy	**10%**	£401,096	£413,892	£426,688	£439,484	£452,280	£465,076	£477,872
	20%	£337,117	£362,709	£388,300	£413,892	£439,484	£465,076	£490,668
	30%	£273,137	£311,525	£349,913	£388,300	£426,688	£465,076	£503,463
	40%	£209,158	£260,341	£311,525	£362,709	£413,892	£465,076	£516,259
	50%	£145,178	£209,158	£273,137	£337,117	£401,096	£465,076	£529,055
	60%	£81,199	£157,974	£234,749	£311,525	£388,300	£465,076	£541,851
	70%	£17,219	£106,790	£196,362	£285,933	£375,504	£465,076	£554,647
	80%	-£46,760	£55,607	£157,974	£260,341	£362,709	£465,076	£567,443

Table E3.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Estimated Land Value Uplift Captured (% of land value uplift)

		Minimum Threshold (£ /m²)						
		£1,300	**£1,400**	**£1,500**	**£1,600**	**£1,700**	**£1,800**	**£1,900**
Infrastructure Levy	**10%**	14%	11%	8%	5%	3%	0%	-3%
	20%	29%	23%	17%	11%	5%	0%	-6%
	30%	43%	34%	26%	17%	8%	0%	-9%
	40%	57%	46%	34%	23%	11%	0%	-12%
	50%	72%	57%	43%	29%	14%	0%	-15%
	60%	86%	69%	52%	34%	17%	0%	-18%
	70%	101%	80%	60%	40%	20%	0%	-20%
	80%	115%	92%	69%	46%	23%	0%	-23%

Table E3.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on IL receipt (£/m² of scheme area)

Minimum threshold (/m²)	Levy rate (%) 20%	30%	40%	50%	60%	70%	80%
£2,000	£100	£150	£200	£250	£300	£350	£400
£1,750	£80	£120	£160	£200	£240	£280	£320
£1,500	£60	£90	£120	£150	£180	£210	£240
£1,250	£40	£60	£80	£100	£120	£140	£160
£1,000	£20	£30	£40	£50	£60	£70	£80
£750	£0	£0	£0	£0	£0	£0	£0
£500	£0	£0	£0	£0	£0	£0	£0

Table E3.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA)

Base build costs (£ /m²)	Market housing values (£ /m²) £1,700	£1,800	£1,900	£2,000	£2,100	£2,200	£2,300
£900	£180,282	£305,742	£431,203	£556,664	£682,124	£807,585	£933,046
£1,000	£96,460	£221,920	£347,381	£472,842	£598,302	£723,763	£849,224
£1,100	£12,638	£138,099	£263,559	£389,020	£514,481	£639,941	£765,402
£1,200	-£71,184	£54,277	£179,737	£305,198	£430,659	£556,119	£681,580
£1,300	-£155,006	-£29,545	£95,916	£221,376	£346,837	£472,297	£597,758
£1,400	-£238,828	-£113,367	£12,094	£137,554	£263,015	£388,476	£513,936
£1,500	-£322,649	-£197,189	-£71,728	£53,732	£179,193	£304,654	£430,114
£1,600	-£406,471	-£281,011	-£155,550	-£30,089	£95,371	£220,832	£346,293

Model E4 - Warehouse scheme

Model inputs

E4.1 Model E4 is premised on a warehouse scheme of 100,000 m² on a 50-hectare greenfield site.

E4.2 In this model the estimated market value/m² was relatively low for distribution uses at £1,482/m², the low build costs also result in a relatively low Minimum Threshold at £1,068/m².

E4.3 It was estimated that the development would be liable for developer contributions under the existing system.

The Levy rate 'window'

E4.4 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

E4.5 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 24%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model E4 this lower bound estimate value for IL is 0%. Figure E4.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

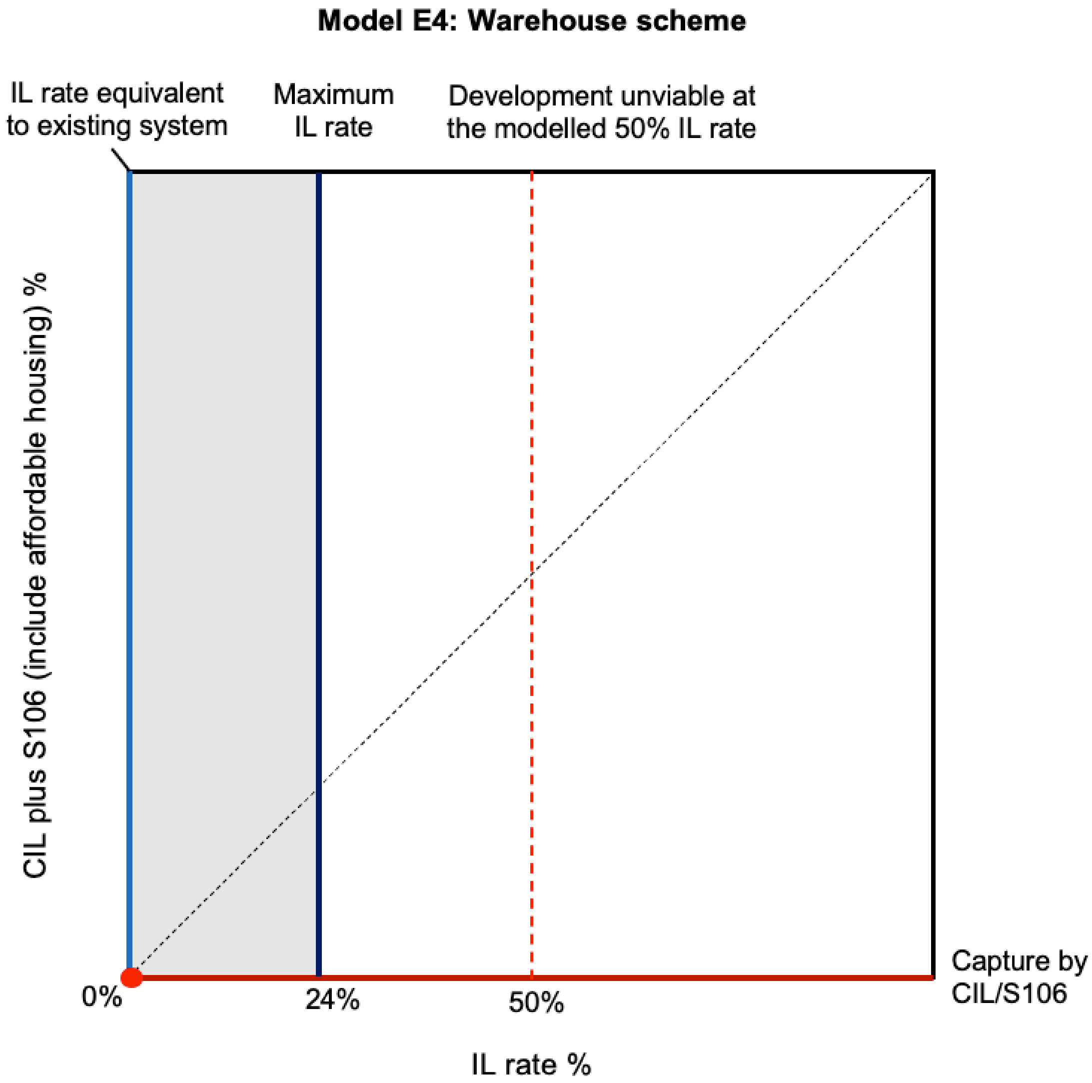
E4.6 In this case there is scope for developer contributions above the levels that have been achieved historically, although the scheme would not be viable at any rate above 24%. The modelled outcomes are sensitive to changes in costs and/or revenues.

Detailed model outputs

E4.7 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. We have chosen to apply this arbitrary rate of 50% throughout all the modelling work in the interests of consistency. However, it can clearly be seen in the case of model E4 that this hypothetical rate exceeds the maximum possible value that the IL could take (24%). Nevertheless, it is instructive to explore the potential impact of rates set above this estimated upper bound. Detailed model outputs are presented in Table E4.1.

E4.8 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure E4.2.

Figure E4.1: IL 'window' diagram for model E4



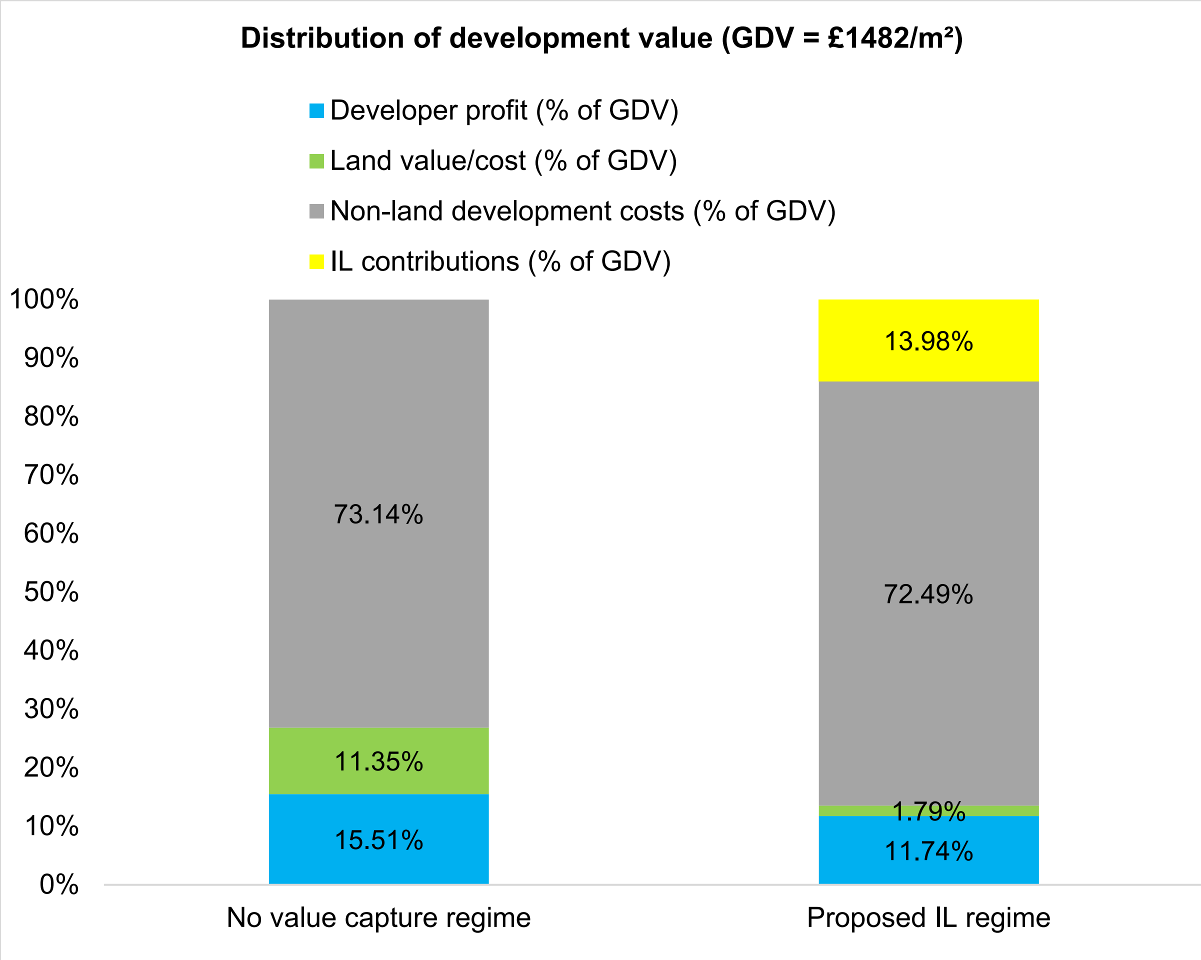
Source: Authors'

Table E4.1: Detailed model outputs for model E4

Key outputs	No LVC	CIL/S106	IL
GDV £/m²	£1,482	£1,482	£1,482
CIL/S106 (£/m² of scheme area)	£0	£0	£0
IL (£/m² of scheme area)	£0	£0	£207
Estimated land value (£/m² of NDA)	£34	£34	£5
Estimated land value (£/ha NDA)	£336,388	£336,388	£53,050
Estimated land value (£/ha GDA)	£336,388	£336,388	£53,050
Estimated total uplift above EUV (£/m² of NDA)	£32	£32	£3
Land value uplift captured (£/m² of NDA)	£0	£0	£28
% total uplift captured	0%	0.00%	89.55%
Total developer investment (£)	£123,762,166	£123,762,166	£108,631,894
Estimated developer profit from project (£)	£22,997,997	£22,997,997	£17,406,975
Developer profit (£/m² of scheme area)	£230	£230	£174
Profit margin (% of GDV)	15.51%	15.51%	11.74%
Profit margin (% of development costs)	18.36%	18.36%	13.32%
ROCE	18.58%	18.58%	16.02%
Equity multiple	1.19	1.19	1.16
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	No		
IL Rate (%) (equivalent to current CIL/S106)	0%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£0		
Maximum Viable IL Rate (%)	24%		
Maximum Viable IL Rate (£/m²)	£100		

Source: Authors'

Figure E4.2: The distribution of GDV under the three scenarios



Source: Authors’

Model E4 - Interpretation

Minimum threshold

E4.9 The minimum threshold for model E4 is £1,068/m².

Developer contributions

E4.10 Model E4 would attract zero developer contributions in local authority Case Study E. As a result, Figure E4.2 reports only the outcomes under a policy free environment and the IL modelled at the hypothetical rate of 50%.

E4.11 If set at the modelled hypothetical rate of 50%, the IL would recover 13.98% of the Gross Development Value (the green shaded area) but would depress land values below BLV. It is, therefore, unlikely that development of this type would come forward if situated in an area where a 50% IL rate applied.

Land values

E4.12 Land values are diminished as result of the imposition of any system of developer contributions. In the policy-free scenario land values account of 11.35% of the total available Gross Development Value. This falls to 1.79% under the IL at the modelled rate of 50%.

E4.13 The modelling estimates that the land value per hectare is £336,000 in the absence of developer contributions. This is more than the Benchmark Land Value. However, at the modelled IL rate of 50% the estimated land value falls to c. £53,000/ha. This is below the Benchmark Land Value and is not viable.

E4.14 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model E4 - Sensitivity Analyses

Table E4.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha NDA)

Infrastructure Levy	Minimum Threshold (£ /m²)						
	£0	**£500**	**£1,000**	**£1,500**	**£2,000**	**£2,500**	**£3,000**
5%	£235,036	£269,221	£303,405	£337,590	£371,774	£405,959	£440,143
10%	£133,684	£202,053	£270,422	£338,791	£407,160	£475,529	£543,898
15%	£32,333	£134,886	£237,439	£339,993	£442,546	£545,099	£647,653
20%	-£69,019	£67,719	£204,456	£341,194	£477,932	£614,670	£751,408
25%	-£170,371	£551	£171,473	£342,396	£513,318	£684,240	£855,163
30%	-£271,723	-£66,616	£138,491	£343,597	£548,704	£753,811	£958,917
35%	-£373,075	-£133,784	£105,508	£344,799	£584,090	£823,381	£1,062,672
40%	-£474,427	-£200,951	£72,525	£346,000	£619,476	£892,952	£1,166,427

Table E4.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Estimated Land Value Uplift Captured (% of land value uplift)

Infrastructure Levy	Minimum Threshold (£ /m²)						
	£0	**£500**	**£1,000**	**£1,500**	**£2,000**	**£2,500**	**£3,000**
5%	32%	21%	10%	0%	-11%	-22%	-33%
10%	64%	42%	21%	-1%	-22%	-44%	-66%
15%	96%	64%	31%	-1%	-34%	-66%	-98%
20%	128%	85%	42%	-2%	-45%	-88%	-131%
25%	160%	106%	52%	-2%	-56%	-110%	-164%
30%	192%	127%	63%	-2%	-67%	-132%	-197%
35%	224%	149%	73%	-3%	-78%	-154%	-230%
40%	256%	170%	83%	-3%	-89%	-176%	-262%

Table E4.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on IL receipt (£/m² of scheme area) GDV = £2,000/m²

Minimum threshold (/m²)		Levy rate (%)						
		20%	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
	£2,500	£0	£0	£0	£0	£0	£0	£0
	£2,250	£0	£0	£0	£0	£0	£0	£0
	£2,000	£0	£0	£0	£0	£0	£0	£0
	£1,750	£0	£0	£0	£0	£0	£0	£0
	£1,500	£0	£0	£0	£0	£0	£0	£0
	£1,250	£46	£70	£93	£116	£139	£163	£186
	£1,000	£96	£145	£193	£241	£289	£338	£386

Table E4.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£ /ha GDA, 50% Levy Rate)

Base build costs (£ /m²)		GDV (£ /m²)						
		£1,450	**£1,550**	**£1,650**	**£1,750**	**£1,850**	**£1,950**	**£2,050**
	£500	£366,539	£433,540	£500,542	£567,543	£634,545	£701,546	£768,548
	£600	£254,800	£321,802	£388,804	£455,805	£522,807	£589,808	£656,810
	£700	£143,062	£210,064	£277,065	£344,067	£411,068	£478,070	£545,071
	£800	£31,324	£98,325	£165,327	£232,328	£299,330	£366,331	£433,333
	£900	-£80,414	-£13,413	£53,589	£120,590	£187,592	£254,593	£321,595
	£1,000	-£192,153	-£125,151	-£58,150	£8,852	£75,853	£142,855	£209,856
	£1,100	-£303,891	-£236,890	-£169,888	-£102,886	-£35,885	£31,117	£98,118
	£1,200	-£415,629	-£348,628	-£281,626	-£214,625	-£147,623	-£80,622	-£13,620

Case Study F: Established urban centre

F1.1. Case Study F has a median house price in the region of £140,000, which has increased in several of the last five years. Median incomes in the authority are in the region of £26,000 and have been increasing in recent years. The affordability ratio of median incomes to median house prices has marginally increased, and in 2020 was around 5.

F1.2 In order to estimate new build house prices in local authority Case Study F we take land registry price paid data and apply a local authority-specific uplift to reflect the locally specific premium paid for new builds in comparison to the secondary market for new dwellings. For Case Study F this premium is 34.6% and is used to compute the values set out in Table F1.1. It should also be noted that the land registry price paid data excludes all categories of affordable housing, the sale of right-to-buy properties, transfers and actions resulting from the enactment of Compulsory Purchase Order powers and court orders.

F1.3. For Case Study F over the five-year period 2016-2020, the scale of new housing delivered has been, on average, approximately 300 dwellings per annum. As year-on-year household growth has been averaging approximately 500 more households per year, recent housing delivery is about 70% of what household growth in the local authority would suggest is required.

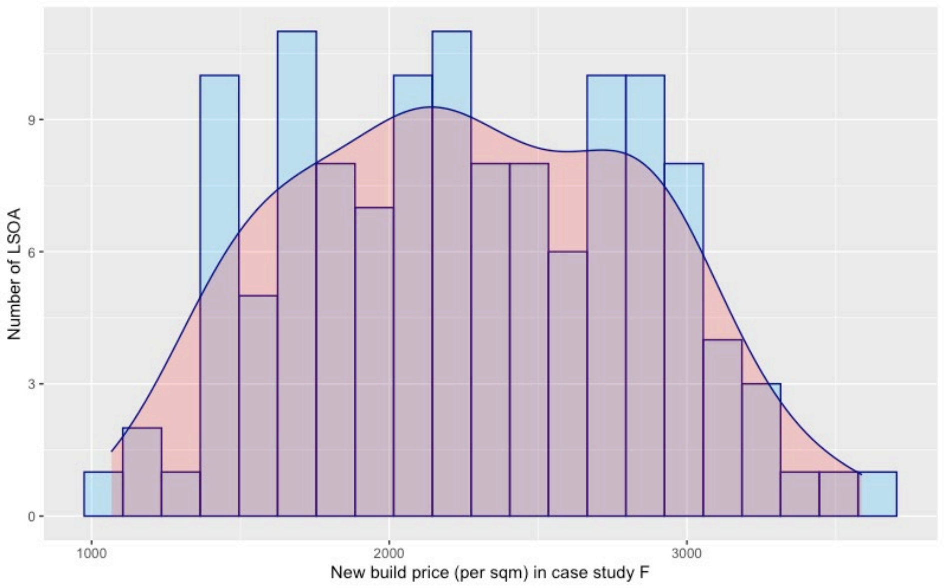
F1.4. Case Study F is also a heterogeneous new build housing market. New build house prices vary between approximately £900/m² and £3,100/m² across the full extent of the LSOAs that comprise the local authority. Development values for new build house prices vary by a factor of approximately 3 across Case Study F. Summary statistics on the variability in new build residential prices is contained in Table F1.1 and Figure F1.1.

Table F1.1: New build house prices in Case Study F (2020)

House price	Average	1st quartile	Median	3rd quartile
New Build	217,420	138,653	188,461	262,499
New Build per sqm	2,391	1,816	2,344	2,899

Source: Author's calculations from HMLR 'price paid' data

Figure F1.1: New build house prices in Case Study F by LSOA (2020)



Source: Author's calculations from HMLR 'price paid' data

Affordable housing, planning obligations and CIL

F1.5 Case Study F is a CIL-charging metropolitan borough.

F1.6 Local planning policy states that up to 15% of private developments will be affordable housing. The Case Study is a CIL charging authority and has charges ranging from £0/m^2 up to £60/m^2 for some residential developments.

F1.7 In recent years the case study has had over 150 planning applications submitted each year, with an average of around 70 for residential developments per annum. Of the six case studies, Case Study F has the highest per capita rate of development in the retail, distribution, and servicing category.

Model Outputs for Case Study F

F1.8 This local authority is a member of the Established Urban Centres family.

F1.9 The local authority requested three residential schemes and a distribution-led scheme to be modelled – all in greenfield settings. The three residential developments are all low-density schemes in respectively higher (Model F1), median (Model F2) and lower (Model F3) value settings.

F1.10 The local authority specified an affordable housing policy of 15% of which just under 5% should be social rented and affordable rented, 3.75% should be First Homes and the remainder being intermediate tenure.

F1.11 Developer contributions were modelled based on CIL liabilities of £60/m^2 (Model F1), £30/m^2 (Model F2) and £0/m^2 (Model F3). For all three residential development scenarios, it was estimated that, in addition to any affordable housing contributions, further S106 contributions amounting to £25/m² would be incurred.

Model F1: Residential development (upper quartile house price = £2,900/m²)

Model inputs

F1.12 Model F1 is a greenfield development on a five-hectare site (gross development area) in a higher value setting providing a mixture of low-density apartments and single-family homes.

F1.13 The local authority specified an affordable housing requirement of 15% of which just under 5% should be social rented, just under 5% should be affordable rented, 3.75% should be First Homes and the remaining 1.5%% should be intermediate tenure.

F1.14 CIL is applied at £60/m² in this higher value setting and S106 contributions are set at £25/m².

The Levy rate 'window'

F1.15 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

F1.16 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 81%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model F1 this lower bound estimate value for IL is 20%. Figure F1.2 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

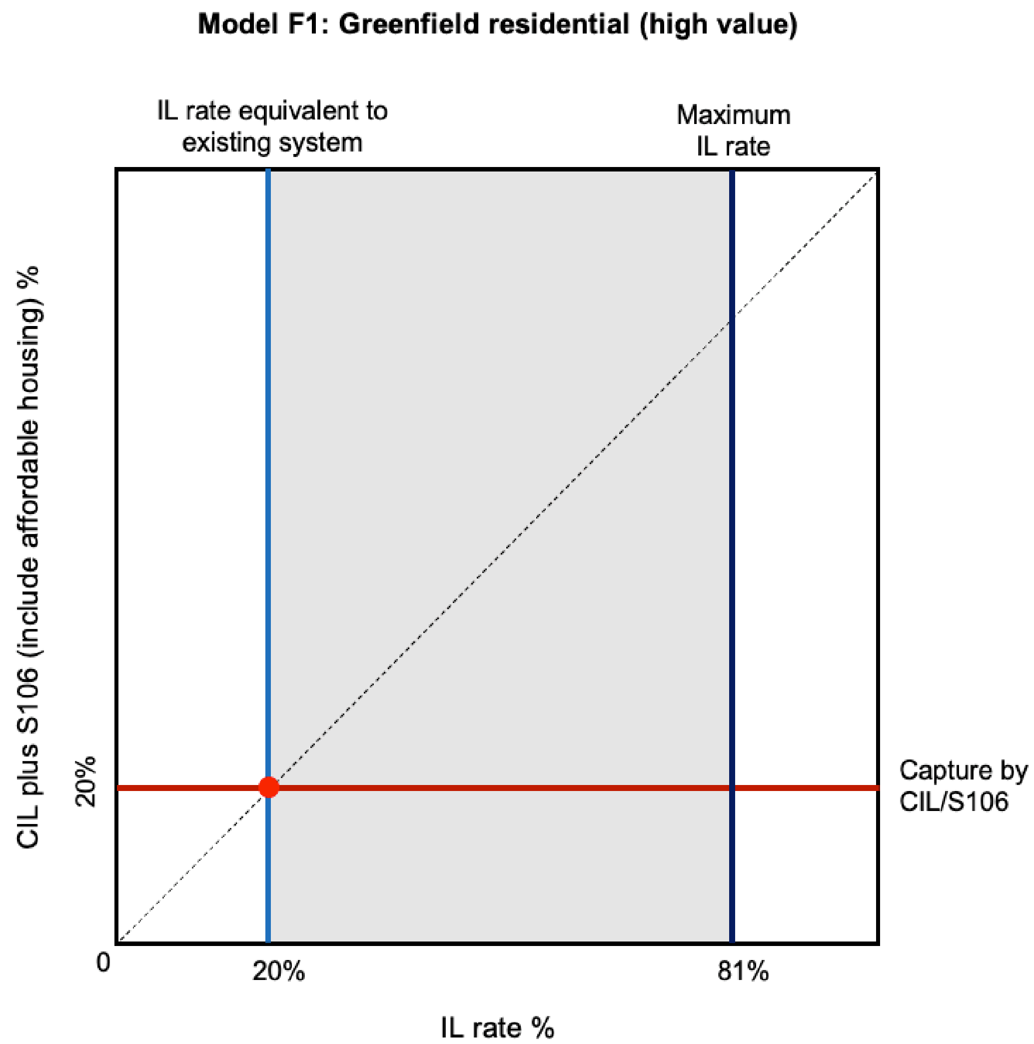
F1.17 In this case there is significant scope for developer contributions above the levels that have been achieved historically under the existing system on a modelled site of this nature - assuming the Benchmark Land Value accurately represents the cost of the land.

Detailed model outputs

F1.18 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model F1 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table F1.2.

F1.19 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure F1.3.

Figure F1.2: IL 'window' diagram for model F1



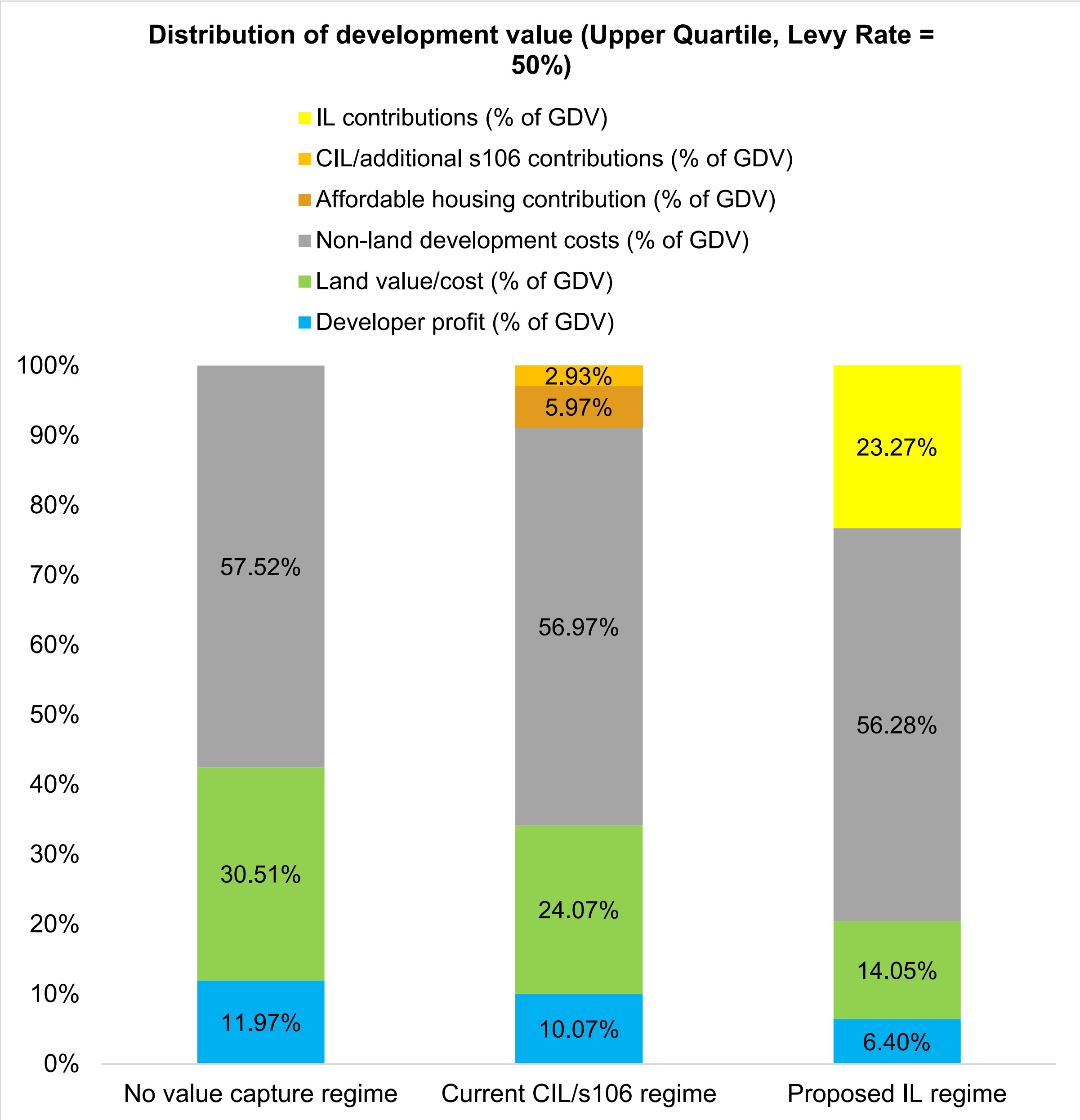
Source: Authors'

Table F1.2: Detailed model outputs for model F1

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before AH discounts)	£2,900	£2,900	£2,900
Value of affordable housing discount (£ /m² of scheme area)	£0	£173	£173
CIL/S106 (£/m² of scheme area)	£0	£85	£0
Gross IL (£/m² of scheme area)	£0	£0	£675
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£502
Affordable housing discounts as a % of value capture	n/a	67%	26%
Estimated land value (£/m² of NDA)	£265	£209	£122
Estimated land value (£/ha NDA)	£2,654,098	£2,094,027	£1,222,092
Estimated land value (£/ha GDA)	£1,592,459	£1,256,416	£733,255
Estimated total land value uplift above EUV (£ /m² of NDA)	£262	£206	£119
Land value uplift captured (£/m² of NDA)	£0	£56	£143
% total uplift captured	0%	21.37%	54.64%
Total developer investment (£)	£10,568,823	£9,177,553	£5,980,674
Estimated developer profit from project (£)	£3,124,240	£2,628,623	£1,669,185
Developer profit (£ m² of scheme area)	£347	£292	£185
Profit margin (% of GDV)	11.97%	10.71%	6.80%
Profit margin (% of development costs)	13.60%	11.99%	7.38%
ROCE	29.56%	28.64%	27.91%
Equity multiple	1.30	1.29	1.28
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	20%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£270		
Maximum Viable IL Rate (%)	81%		
Maximum Viable IL Rate (£/m²)	£1,092		

Source: Authors'

Figure F1.3: The distribution of GDV under the three scenarios



Source: Authors'

Model F1 - Interpretation

Minimum threshold

F1.20 The minimum threshold for model F1 is £1,550/m².

Developer contributions

F1.21 Model F1 shows total developer contributions under the existing system of 8.9% of which 5.97% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 2.93% through CIL and non-affordable housing S106 contributions (the red shaded area).

F1.22 If set at the modelled hypothetical rate of 50% the IL would recover 23.27% of the Gross Development Value (the green shaded area), 14.37% greater than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL, 5.97% of GDV would go to maintaining levels of affordable housing, leaving 17.30% of GDV available for non-affordable housing contributions.

Land values

F1.23 Land values are diminished as result of the imposition of any system of developer contributions. In the policy-free scenario land values account of 30.51% of the total available Gross Development Value. This falls to 24.07% under the existing system and to 14.05% under the proposed IL.

F1.24 The land value reduction suggests then that around £0.56 million of the land value is being captured under the existing system resulting in a reduction of c. 21% of the land value estimate with zero developer contributions.

F1.25 At the modelled rate of 50% around £1.4 million of the land value is being captured. This represents a reduction of c. 54% compared to the land value estimated assuming zero developer contributions.

F1.26 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model F1 - Sensitivity analyses

Table F1.3: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA)

		Minimum Threshold (£ /m²)						
		£1,300	**£1,400**	**£1,500**	**£1,600**	**£1,700**	**£1,800**	**£1,900**
Infrastructure Levy	**10%**	£1,392,149	£1,404,945	£1,417,741	£1,430,537	£1,443,333	£1,456,129	£1,468,925
	20%	£1,187,415	£1,213,007	£1,238,599	£1,264,190	£1,289,782	£1,315,374	£1,340,966
	30%	£982,681	£1,021,068	£1,059,456	£1,097,844	£1,136,231	£1,174,619	£1,213,007
	40%	£777,946	£829,130	£880,313	£931,497	£982,681	£1,033,864	£1,085,048
	50%	£573,212	£637,191	£701,171	£765,150	£829,130	£893,109	£957,089
	60%	£368,477	£445,253	£522,028	£598,803	£675,579	£752,354	£829,130
	70%	£163,743	£253,314	£342,885	£432,457	£522,028	£611,599	£701,171
	80%	-£40,992	£61,375	£163,743	£266,110	£368,477	£470,844	£573,212

Table F1.4: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Estimated Land Value Uplift Captured (% of land value uplift)

		Minimum Threshold (£ /m²)						
		£1,300	**£1,400**	**£1,500**	**£1,600**	**£1,700**	**£1,800**	**£1,900**
Infrastructure Levy	**10%**	13%	12%	11%	10%	9%	9%	8%
	20%	26%	24%	23%	21%	19%	18%	16%
	30%	39%	36%	34%	31%	29%	27%	24%
	40%	52%	49%	45%	42%	39%	36%	32%
	50%	65%	61%	57%	53%	49%	44%	40%
	60%	78%	73%	68%	63%	58%	53%	49%
	70%	91%	85%	79%	74%	68%	62%	57%
	80%	104%	97%	91%	84%	78%	71%	65%

Table F1.5: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on IL receipt (£/m² of scheme area)

Minimum threshold (£/m²)	Levy rate (%)						
	20%	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
£1,300	£320	£480	£640	£800	£960	£1,120	£1,280
£1,400	£300	£450	£600	£750	£900	£1,050	£1,200
£1,500	£280	£420	£560	£700	£840	£980	£1,120
£1,600	£260	£390	£520	£650	£780	£910	£1,040
£1,700	£240	£360	£480	£600	£720	£840	£960
£1,800	£220	£330	£440	£550	£660	£770	£880
£1,900	£200	£300	£400	£500	£600	£700	£800

Table F1.6: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA)

Base build costs (£ /m²)	Market housing values (£ /m²)						
	£2,600	**£2,700**	**£2,800**	**£2,900**	**£3,000**	**£3,100**	**£3,200**
£1,050	£482,331	£607,883	£733,436	£858,988	£984,540	£1,110,093	£1,235,645
£1,100	£440,420	£565,972	£691,525	£817,077	£942,629	£1,068,182	£1,193,734
£1,150	£398,509	£524,061	£649,614	£775,166	£900,719	£1,026,271	£1,151,823
£1,200	£356,598	£482,150	£607,703	£733,255	£858,808	£984,360	£1,109,913
£1,250	£314,687	£440,239	£565,792	£691,344	£816,897	£942,449	£1,068,002
£1,300	£272,776	£398,328	£523,881	£649,433	£774,986	£900,538	£1,026,091
£1,350	£230,865	£356,417	£481,970	£607,522	£733,075	£858,627	£984,180
£1,400	£188,954	£314,507	£440,059	£565,611	£691,164	£816,716	£942,269

Model F2: Residential development (median house price = £2,350/m²)

Model inputs

F2.1 Model F2 is a greenfield development on a five-hectare site (gross development area) hectare site in a median value setting providing a mixture of low-density apartments and single-family homes.

F2.2 The local authority specified an identical affordable housing requirement to Model F1 of 15% of which just under 5% should be social rented and affordable rented, 3.75% should be First Homes with the remainder being intermediate tenure.

F2.3 CIL is applied at £30/m² in this median value setting and S106 contributions are set at £25/m².

The Levy rate 'window'

F2.4 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

F2.5 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 69%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model F2 this lower bound estimate value for IL is 27%. Figure F2.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

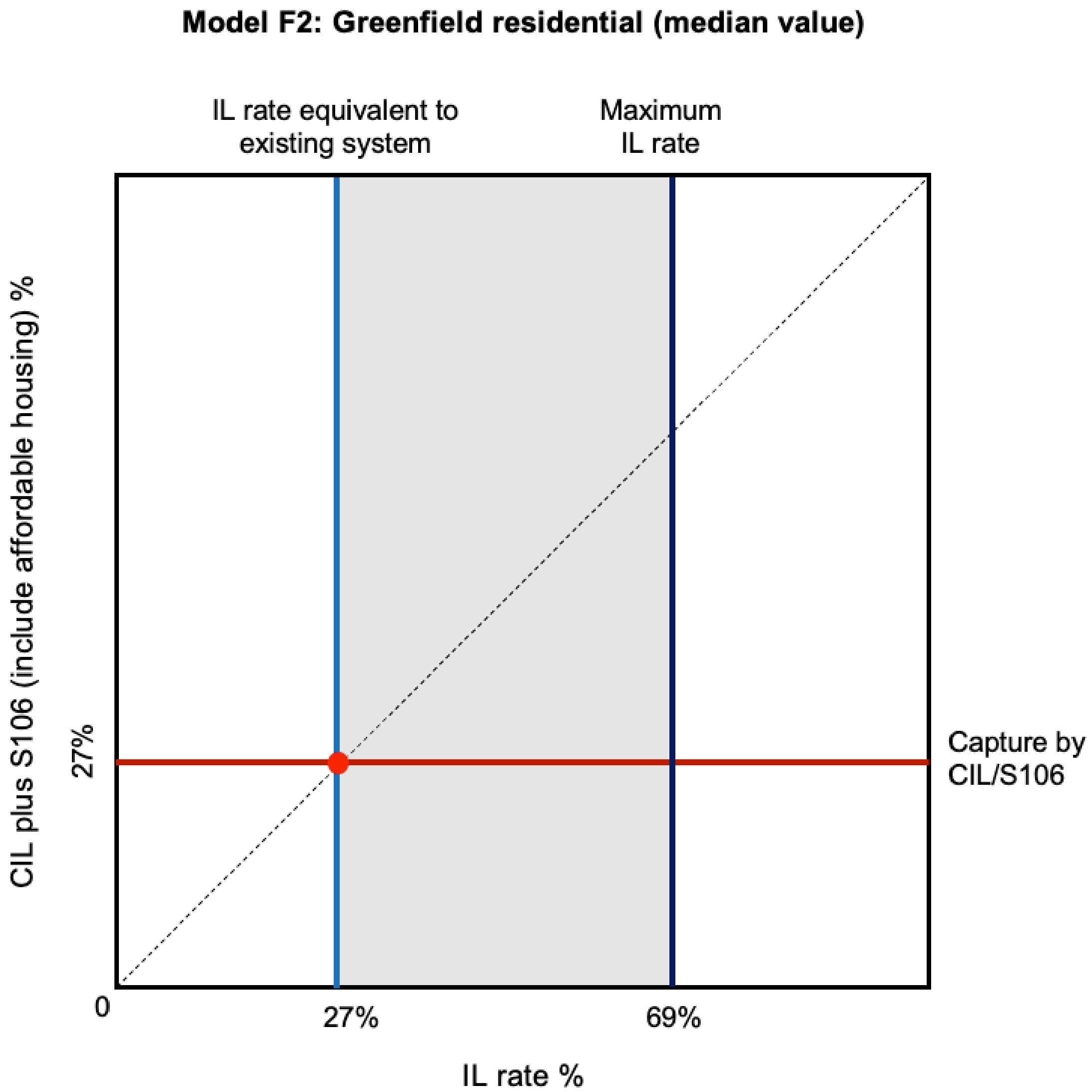
F2.6 In this case there is significant scope for developer contributions - although somewhat less than in the higher value setting represented by Model F1. It is worth noting that the principal explanatory feature in accounting for the differential performance of the IL is development values.

Detailed model outputs

F2.7 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. In the case of model F2 this hypothetical value for the IL is within the central range of values between the lower and upper bounds. Detailed model outputs are presented in Table F2.1.

F2.8 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure F2.2.

Figure F2.1: IL 'window' diagram for model F2



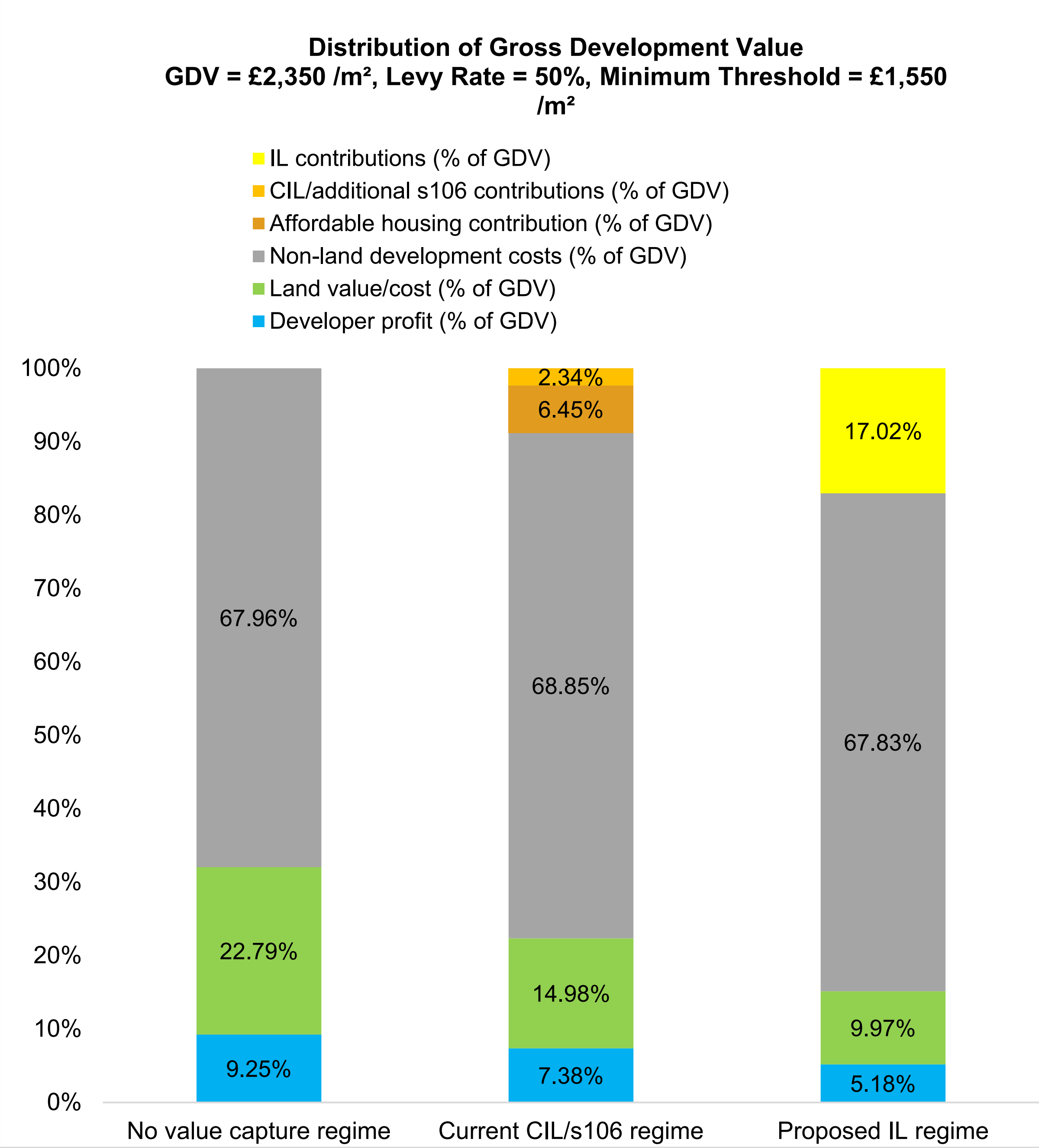
Source: Authors'

Table F2.1: Detailed model outputs for model F2

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before AH discounts)	£2,350	£2,350	£2,350
Value of affordable housing discount (£ /m² of scheme area)	£0	£152	£152
CIL/S106 (£/m² of scheme area)	£0	£55	£0
Gross IL (£/m² of scheme area)	£0	£0	£400
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£248
Affordable housing discounts as a % of value capture	n/a	73%	38%
Estimated land value (£/m² of NDA)	£150	£106	£66
Estimated land value (£/ha NDA)	£1,504,600	£1,056,285	£658,165
Estimated land value (£/ha GDA)	£902,760	£633,771	£394,899
Estimated total uplift above EUV (£/m² of NDA)	£147	£102	£62
Land value uplift captured (£/m² of NDA)	£0	£45	£85
% total uplift captured	0%	30.47%	57.53%
Total developer investment (£)	£6,885,829	£5,763,530	£4,173,851
Estimated developer profit from project (£)	£1,956,239	£1,560,748	£1,096,180
Developer profit (£/m² of scheme area)	£217	£173	£122
Profit margin (% of GDV)	9.25%	7.89%	5.54%
Profit margin (% of development costs)	10.19%	8.56%	5.91%
ROCE	28.41%	27.08%	26.26%
Equity multiple	1.28	1.27	1.26
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	Yes		
IL Rate (%) (equivalent to current CIL/S106)	27%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£213		
Maximum Viable IL Rate (%)	69%		
Maximum Viable IL Rate (£/m²)	£552		

Source: Authors'

Figure F2.2: The distribution of GDV under the three scenarios



Source: Authors'

Model F2 - Interpretation

Minimum threshold

F2.9 The minimum threshold for model F2 is £1,550/m².

Developer contributions

F2.10 Model F2 shows total developer contributions under the existing system of 8.79% of which 6.45% comes in the form of affordable housing contributions exacted through S106 contributions (the yellow shaded area) and 2.34% through CIL and non-affordable housing S106 contributions (the red shaded area).

F2.11 At the hypothetical modelled rate of 50% the IL recovers 17.02% of the Gross Development Value (the green shaded area), 8.23% greater than the current system. As we have assumed that affordable housing contributions are equivalent between the two systems this would effectively mean that for the total exaction achieved under the IL, 6.45% of GDV would go to maintaining levels of affordable housing, leaving 10.57% of GDV available for infrastructure and public goods.

Land values

F2.12 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 22.79% of the total available Gross Development Value. This falls to 14.98% under the existing system and to 9.97% under the proposed IL.

F2.13 The land value reduction suggests that the existing system captures around £0.45 million of the land value representing a reduction of c. 29% of the land value estimate with zero developer contributions.

F2.14 For the IL scenario at the modelled rate of 50%, the estimated land value is £394,899/ha of gross developable area. The total developer's profit is estimated at £1.1 million for a required equity investment of £4.2 million producing an estimated Return on Capital Employed of just over 26%.

F2.15 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model F2 - Sensitivity analyses

Table F2.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA)

Infrastructure Levy	Minimum Threshold (£ /m²)						
	£1,200	**£1,300**	**£1,400**	**£1,500**	**£1,600**	**£1,700**	**£1,800**
10%	£759,486	£772,282	£785,078	£797,874	£810,670	£823,466	£836,261
20%	£612,333	£637,925	£663,517	£689,109	£714,701	£740,292	£765,884
30%	£465,181	£503,569	£541,956	£580,344	£618,732	£657,119	£695,507
40%	£318,028	£369,212	£420,395	£471,579	£522,763	£573,946	£625,130
50%	£170,876	£234,855	£298,835	£362,814	£426,794	£490,773	£554,753
60%	£23,723	£100,498	£177,274	£254,049	£330,825	£407,600	£484,376
70%	-£123,430	-£33,858	£55,713	£145,284	£234,856	£324,427	£413,998
80%	-£270,582	-£168,215	-£65,848	£36,520	£138,887	£241,254	£343,621

Table F2.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Estimated Land Value Uplift Captured (%)

Infrastructure Levy	Minimum Threshold (£ /m²)						
	£1,200	**£1,300**	**£1,400**	**£1,500**	**£1,600**	**£1,700**	**£1,800**
10%	16%	15%	13%	12%	10%	9%	8%
20%	33%	30%	27%	24%	21%	18%	16%
30%	50%	45%	41%	37%	32%	28%	23%
40%	66%	60%	55%	49%	43%	37%	31%
50%	83%	76%	68%	61%	54%	47%	39%
60%	100%	91%	82%	73%	65%	56%	47%
70%	116%	106%	96%	86%	76%	66%	55%
80%	133%	121%	110%	98%	87%	75%	63%

Table F2.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on IL receipt (£ /m² of scheme area)

	Levy rate (%)						
Minimum threshold	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
£1,200	£230	£345	£460	£575	£690	£805	£920
£1,300	£210	£315	£420	£525	£630	£735	£840
£1,400	£190	£285	£380	£475	£570	£665	£760
£1,500	£170	£255	£340	£425	£510	£595	£680
£1,600	£150	£225	£300	£375	£450	£525	£600
£1,700	£130	£195	£260	£325	£390	£455	£520
£1,800	£110	£165	£220	£275	£330	£385	£440

Table F2.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£ /ha GDA) 50% Levy Rate

	Market housing values (£ /m²)						
Base build costs £ /m²	**£2,000**	**£2,100**	**£2,200**	**£2,300**	**£2,400**	**£2,500**	**£2,600**
£1,450	-£30,205	£31,380	£92,966	£154,551	£216,137	£277,722	£339,308
£1,400	£11,706	£73,291	£134,877	£196,462	£258,048	£319,633	£381,219
£1,350	£53,617	£115,202	£176,788	£238,373	£299,959	£361,544	£423,130
£1,300	£95,528	£157,113	£218,699	£280,284	£341,870	£403,455	£465,041
£1,250	£137,439	£199,024	£260,610	£322,195	£383,781	£445,366	£506,951
£1,200	£179,350	£240,935	£302,521	£364,106	£425,691	£487,277	£548,862
£1,150	£221,261	£282,846	£344,431	£406,017	£467,602	£529,188	£590,773
£1,100	£263,171	£324,757	£386,342	£447,928	£509,513	£571,099	£632,684

Model F3 - Residetial development (lower quartile house price = £1800/m²)

Model inputs

F3.1 Model F3 is a greenfield development on a five-hectare site (gross development area) in a lower value setting providing a mixture of low-density apartments and single-family homes.

F3.2 The local authority specified an affordable housing requirement of 15% of which just under 5% should be social rented, just under 5% should be affordable rented, 3.75% should be First Homes and the remaining 1.5%% should be intermediate tenure

F3.3 CIL is applied at £0/m² in this lower value setting and S106 contributions are set at £25/m².

The Levy rate 'window'

F3.4 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

F3.5 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 4%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model F3 this lower bound estimate value for IL is 42%. The inversion of the upper and lower bounds implies that the policy-compliant implementation of the existing system is effectively unviable: it results in a greater scale of developer contributions than the maximum value the IL could take. This phenomenon is discussed further below.

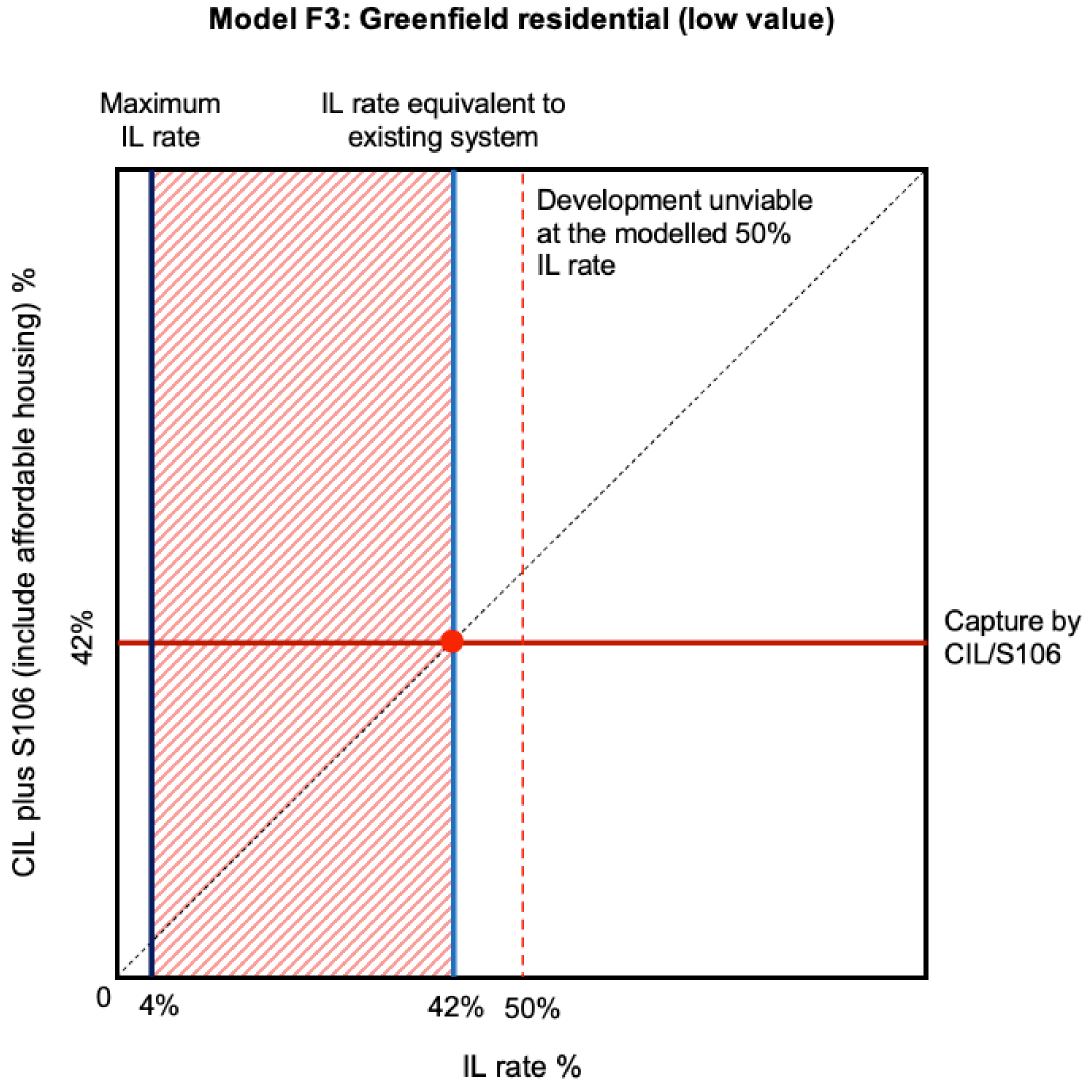
F3.6 Figure F3.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

Detailed model outputs

F3.7 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. We have chosen to apply this arbitrary rate of 50% throughout all the modelling work in the interests of consistency. However, it can clearly be seen in the case of model F3 that this hypothetical rate exceeds the maximum possible value that the IL could take. Indeed, the lower bound rate of 42% exceeds the maximum rate that the modelling analysis suggests might be applied (4%). The most likely explanation for this ‘negative window’ is that the policy-compliant existing system is incompatible with development viability and represents an over-statement of what might be achieved in practice. Detailed model outputs are presented in Table F3.1.

F3.8 For all scenarios the distribution of development revenues between land costs, developer’s profit, developer contributions and other non-land development costs is illustrated as Figure F3.2.

Figure F3.1: IL ‘window’ diagram for model F3



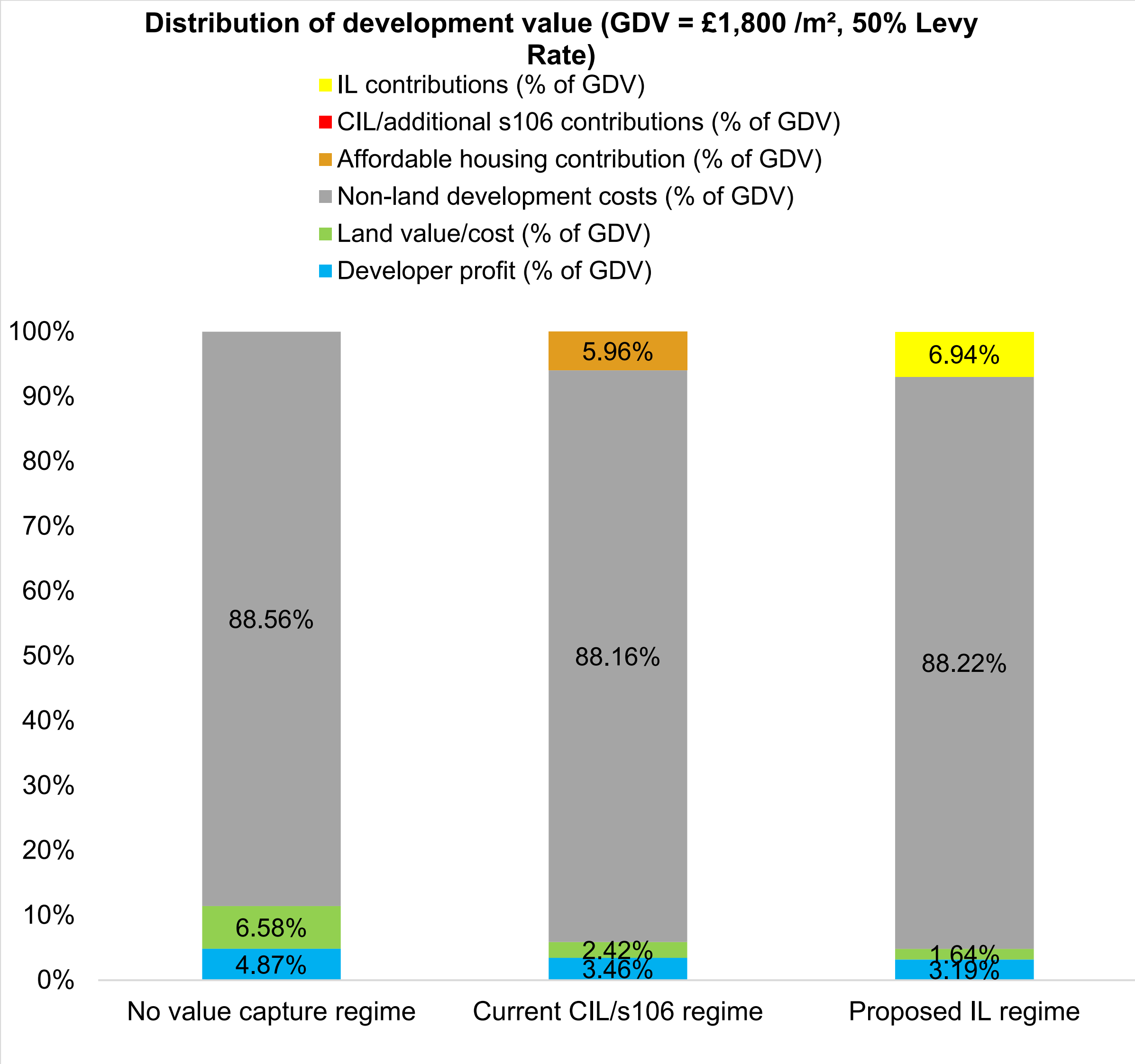
Source: Authors’

Table F3.1: Detailed model outputs for model F3

Key outputs	No LVC	CIL/S106	IL
GDV £/m² (before AH discounts)	£1,800	£1,800	£1,800
Value of affordable housing discount (£ /m² of scheme area)	£0	£107	£0
CIL/S106 (£/m² of scheme area)	£0	£0	£0
Gross IL (£/m² of scheme area)	£0	£0	£125
Net of affordable housing IL (£/m² of scheme area)	£0	£0	£125
Affordable housing discounts as a % of value capture	n/a	100%	0%
Estimated land value (£/m² of NDA)	£36	£13	£9
Estimated land value (£/ha NDA)	£355,101	£130,792	£88,679
Estimated land value (£/ha GDA)	£213,060	£78,475	£53,208
Estimated total uplift above EUV (£/m² of NDA)	£32	£10	£6
Land value uplift captured (£/m² of NDA)	£0	£22	£27
% total uplift captured	0%	69.71%	82.80%
Total developer investment (£)	£3,202,834	£2,484,148	£2,349,220
Estimated developer profit from project (£)	£788,238	£560,319	£517,529
Developer profit (£/m² of scheme area)	£88	£62	£58
Profit margin (% of GDV)	4.87%	3.68%	3.19%
Profit margin (% of development costs)	5.11%	3.82%	3.30%
ROCE	24.61%	22.56%	22.03%
Equity multiple	1.25	1.23	1.22
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	No		
IL Rate (%) (equivalent to current CIL/S106)	42%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£151		
Maximum Viable IL Rate (%)	4%		
Maximum Viable IL Rate (£/m²)	£10		

Source: Authors'

Figure F3.2: The distribution of GDV under the three scenarios



Source: Authors'

Model F3 - Interpretation

Minimum threshold

F3.9 The minimum threshold for model F3 is £1,550/m².

Developer Contributions

F3.10 This development would not incur any CIL liability as it is a zero-rated area. Moreover, it should be noted that the policy-compliant scale of developer contributions under the existing system (equivalent to an IL rate of 42%) would not be viable as it depresses land values below the BLV. In practice a lower level of developer contributions would be necessary to preserve development viability in this case.

F3.11 It is, nevertheless, instructive to consider the effect of an IL rate of 50% as modelled above in Figure F3.2. Were the IL to be set at this rate, exceeding the upper value our analysis would suggest it could take whilst maintaining development viability, it may be the case that development would not come forward. Stated alternatively the 6.94% of GDV that would be secured under an IL rate of 50% would come at the expense of land values which would be supressed to unviable levels.

Land values

F3.12 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 6.58% of the total available Gross Development Value. This falls to 2.42% under the existing system and to 1.64% under the proposed IL. The estimated land value in the policy free environment is c. £213,060/ha. This is only marginally above the Benchmark Land Value of £200,000/ha which clearly indicates that there is little scope for land value capture.

F3.13 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model F3 - Sensitivity Analyses

Table F3.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha GDA)

		Minimum Threshold (£ /m²)						
		£1,300	**£1,400**	**£1,500**	**£1,600**	**£1,700**	**£1,800**	**£1,900**
Infrastructure Levy	**10%**	£149,081	£161,877	£174,673	£187,469	£200,265	£213,061	£225,857
	20%	£85,102	£110,694	£136,286	£161,877	£187,469	£213,061	£238,653
	30%	£21,123	£59,510	£97,898	£136,286	£174,673	£213,061	£251,449
	40%	-£42,857	£8,327	£59,511	£110,694	£161,878	£213,061	£264,245
	50%	-£106,836	-£42,856	£21,123	£85,103	£149,082	£213,062	£277,041
	60%	-£170,815	-£94,040	-£17,264	£59,511	£136,286	£213,062	£289,837
	70%	-£234,795	-£145,223	-£55,652	£33,919	£123,491	£213,062	£302,633
	80%	-£298,774	-£196,407	-£94,039	£8,328	£110,695	£213,062	£315,430

Table F3.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Estimated Land Value Uplift Captured (%)

		Minimum Threshold (£ /m²)						
		£1,300	**£1,400**	**£1,500**	**£1,600**	**£1,700**	**£1,800**	**£1,900**
Infrastructure Levy	**10%**	33%	27%	20%	13%	7%	0%	-7%
	20%	66%	53%	40%	27%	13%	0%	-13%
	30%	99%	80%	60%	40%	20%	0%	-20%
	40%	133%	106%	80%	53%	27%	0%	-27%
	50%	166%	133%	99%	66%	33%	0%	-33%
	60%	199%	159%	119%	80%	40%	0%	-40%
	70%	232%	186%	139%	93%	46%	0%	-46%
	80%	265%	212%	159%	106%	53%	0%	-53%

Table F3.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on IL receipt (£ /m² of scheme area) GDV = £2,000 /m²

Minimum threshold	Levy rate (%)						
	20%	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
£2,000	£0	£0	£0	£0	£0	£0	£0
£1,750	£10	£15	£20	£25	£30	£35	£40
£1,500	£60	£90	£120	£150	£180	£210	£240
£1,250	£110	£165	£220	£275	£330	£385	£440
£1,000	£160	£240	£320	£400	£480	£560	£640
£750	£210	£315	£420	£525	£630	£735	£840
£500	£260	£390	£520	£650	£780	£910	£1,040

Table F3.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£ /ha GDA) 50% Levy Rate

Base build costs (£ /m²)	Market housing values (£ /m²)						
	£1,600	**£1,700**	**£1,800**	**£1,900**	**£2,000**	**£2,100**	**£2,200**
£800	£265,654	£327,075	£388,495	£449,915	£511,336	£572,756	£634,177
£900	£181,832	£243,253	£304,673	£366,094	£427,514	£488,934	£550,355
£1,000	£98,011	£159,431	£220,851	£282,272	£343,692	£405,113	£466,533
£1,100	£14,189	£75,609	£137,029	£198,450	£259,870	£321,291	£382,711
£1,200	-£69,633	-£8,213	£53,208	£114,628	£176,048	£237,469	£298,889
£1,300	-£153,455	-£92,035	-£30,614	£30,806	£92,227	£153,647	£215,067
£1,400	-£237,277	-£175,857	-£114,436	-£53,016	£8,405	£69,825	£131,246
£1,500	-£321,099	-£259,678	-£198,258	-£136,838	-£75,417	-£13,997	£47,424

Model F4 - Warehouse Scheme

Model inputs

F4.1 Model F4 is premised on a warehouse scheme of 100,000 m² on a 50-hectare greenfield site.

F4.2 In this case study estimated Market Value/m² was relatively low for distribution uses at £1,482/m², the low build costs also result in a relatively low Minimum Threshold at £1,068/m².

F4.3 It was estimated that in the current regime a zero CIL rate was applied to warehouse developments with no S106 contributions.

The Levy rate 'window'

F4.4 Given the input parameters specified by the local authority and secondary sources on the costs of development (see Chapter 2 for a full description of methodology) modelling work can be undertaken to identify the range of values that the IL might take with respect to this development type.

F4.5 Assuming a Benchmark Land Value of £200,000/ha of gross developable area, it is estimated that the upper bound, maximum rate at which the IL could be set whilst maintaining the BLV and the profit motive to the developer of 15% IRR would be 24%. Similarly, a lower bound rate can be identified that is pegged to the scale of developer contributions that would follow under a policy-compliant implementation of the existing system. In model F4 this lower bound estimate value for IL is 0%. Figure F4.1 provides a visual representation of this IL 'window' and a corresponding indication of how this range of values relates to the performance of the existing system in this scenario.

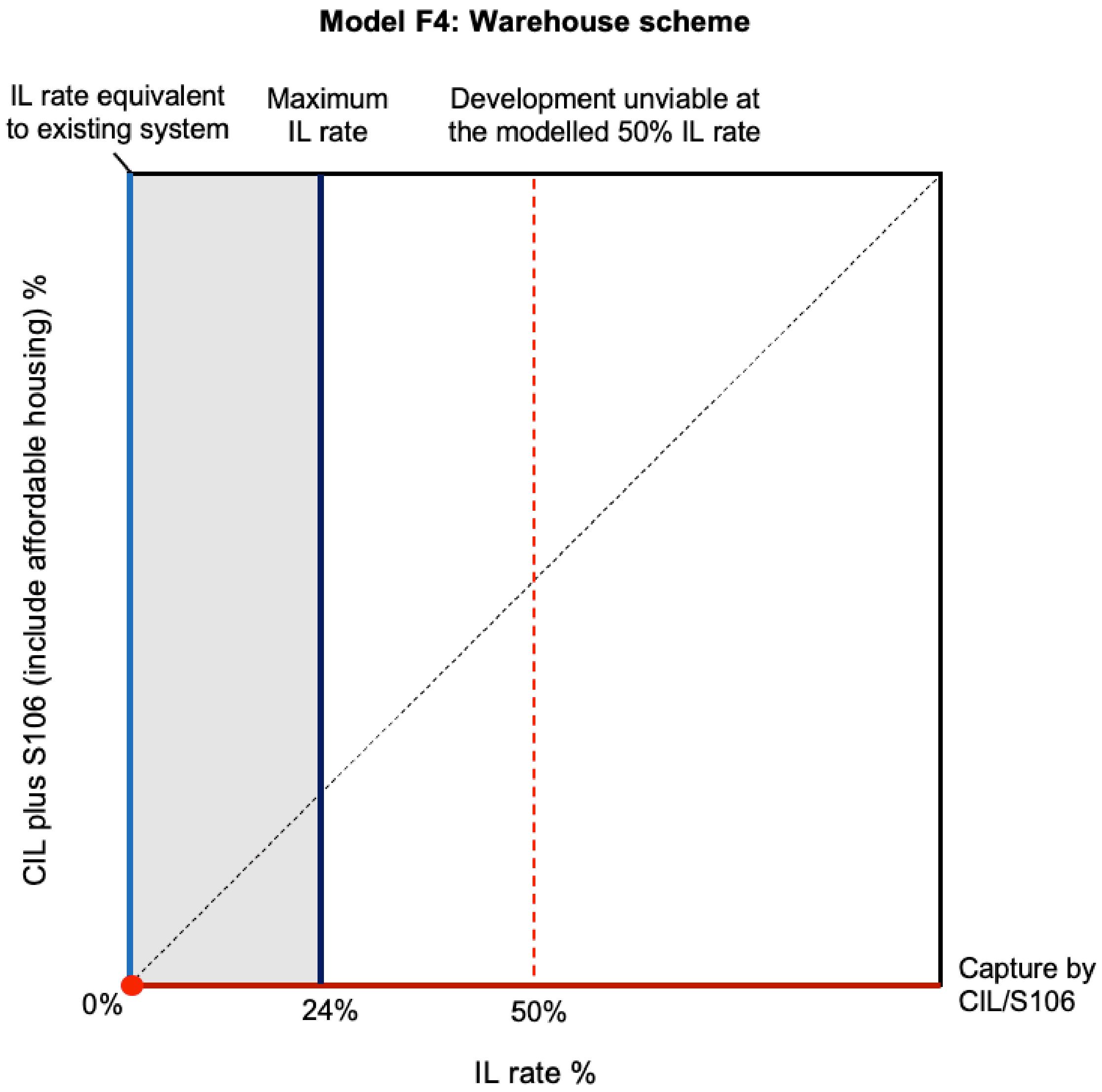
F4.6 In this case there is scope for developer contributions above the levels that have been achieved historically. However, the modelled outcomes are extremely sensitive to changes in costs and/or revenues.

Detailed model outputs

F4.7 From within this window of values that IL might take we provide detailed model outputs for three specific scenarios for each development type: a 'policy off' option where no land value capture system is in operation, the existing system of S106 and CIL in combination and the proposed Infrastructure Levy set at an arbitrary, nominal rate of 50%. We have chosen to apply this arbitrary rate of 50% throughout all the modelling work in the interests of consistency. However, it can clearly be seen in the case of model F4 that this hypothetical rate exceeds the maximum possible value that the IL could take (24%). Nevertheless, it is instructive to explore the potential impact of rates set above this upper threshold. Detailed model outputs are presented in Table F4.1.

F4.8 For all scenarios the distribution of development revenues between land costs, developer's profit, developer contributions and other non-land development costs is illustrated as Figure F4.2.

Figure F4.1: IL 'window' diagram for model F4



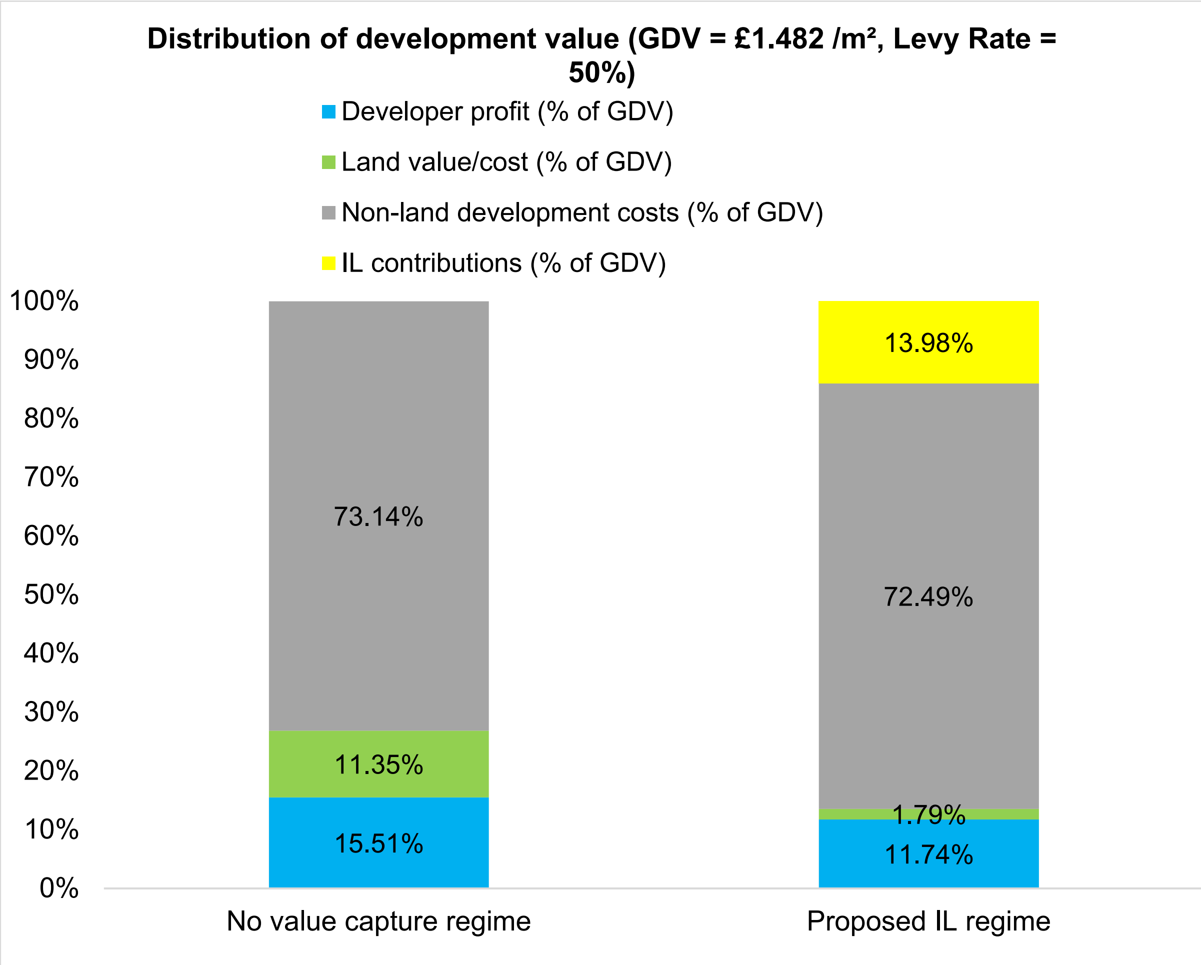
Source: Authors'

Table F4.1: Detailed model outputs for model F4

Key outputs	No LVC	CIL/S106	IL
GDV £/m²	£1,482	£1,482	£1,482
CIL/S106 (£ /m² of scheme area)	£0	£0	£0
IL (£ /m² of scheme area)	£0	£0	£207
Estimated land value (£/m² of NDA)	£34	£34	£5
Estimated land value (£/ha NDA)	£336,388	£336,388	£53,050
Estimated land value (£/ha GDA)	£336,388	£336,388	£53,050
Estimated total uplift above EUV (£/m² of NDA)	£32	£32	£3
Land value uplift captured (£/m² of NDA)	£0	£0	£28
% total uplift captured	0%	0.00%	89.55%
Total developer investment (£)	£123,762,166	£123,762,166	£108,631,894
Estimated developer profit from project (£)	£22,997,997	£22,997,997	£17,406,975
Developer profit (£ /m² of scheme area)	£230	£230	£174
Profit margin (% of GDV)	15.51%	15.51%	11.74%
Profit margin (% of development costs)	18.36%	18.36%	13.32%
ROCE	18.58%	18.58%	16.02%
Equity multiple	1.19	1.19	1.16
IRR (per quarter)	3.56%	3.56%	3.56%
IRR (per annum)	15.00%	15.00%	15.00%
Benchmark Land Value (10 x Agricultural value)	£200,000		
Viable at 50% IL rate?	No		
IL Rate (%) (equivalent to current CIL/S106)	0%		
IL Rate (£/m²) (equivalent to current CIL/S106)	£0		
Maximum Viable IL Rate (%)	24%		
Maximum Viable IL Rate (£/m²)	£99		

Source: Authors’

Figure F4.2: The distribution of GDV under the three scenarios



Source: Authors'

Model F4 - Interpretation

Minimum threshold

F4.9 The minimum threshold for model F4 is £1,068/m².

Developer contributions

F4.10 Model F4 would attract zero developer contributions in local authority Case Study F. As a result, Figure F4.2 reports only the outcomes under a policy free environment and the IL modelled at the hypothetical rate of 50%.

F4.11 If set at the modelled hypothetical rate of 50%, the IL would recover 13.98% of the Gross Development Value (the green shaded area) but would depress land values below BLV. It is, therefore, unlikely that development of this type would come forward if situated in an area where a 50% IL rate applied.

Land values

F4.12 Land values are diminished because of the imposition of any system of developer contributions. In the policy-free scenario land values account for 11.35% of the total available Gross Development Value. This falls to 1.79% under the IL at the modelled rate of 50%.

F4.13 The modelling estimates that the land value per hectare is £336,000 in the absence of developer contributions. This is more than the Benchmark Land Value. However, at the modelled IL rate of 50% the estimated land value falls to c. £53,000/ha which is significantly below BLV of £200,000/ha.

F4.14 The following sensitivity tables provide an insight into how model outputs are affected by changes to the key inputs.

Model F4 - Sensitivity analyses

Table F4.2: Impact on land values at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£/ha)

Infrastructure Levy	Minimum Threshold (£ /m²)						
	£700	£800	£900	£1,000	£1,100	£1,200	£1,300
10%	£229,401	£243,075	£256,748	£270,422	£284,096	£297,770	£311,444
20%	£122,414	£149,761	£177,109	£204,456	£231,804	£259,152	£286,499
30%	£15,427	£56,448	£97,469	£138,491	£179,512	£220,533	£261,555
40%	-£91,561	-£36,866	£17,830	£72,525	£127,220	£181,915	£236,610
50%	-£198,548	-£130,179	-£61,810	£6,559	£74,928	£143,297	£211,666
60%	-£305,535	-£223,492	-£141,450	-£59,407	£22,636	£104,678	£186,721
70%	-£412,522	-£316,806	-£221,089	-£125,373	-£29,656	£66,060	£161,777
80%	-£519,509	-£410,119	-£300,729	-£191,339	-£81,948	£27,442	£136,832

Table F4.3: Impact on LVC at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on Estimated Land Value Uplift Captured (%)

Infrastructure Levy	Minimum Threshold (£ /m²)						
	£700	£800	£900	£1,000	£1,100	£1,200	£1,300
10%	34%	29%	25%	21%	17%	12%	8%
20%	68%	59%	50%	42%	33%	24%	16%
30%	101%	88%	76%	63%	50%	37%	24%
40%	135%	118%	101%	83%	66%	49%	32%
50%	169%	147%	126%	104%	83%	61%	39%
60%	203%	177%	151%	125%	99%	73%	47%
70%	237%	206%	176%	146%	116%	85%	55%
80%	271%	236%	201%	167%	132%	98%	63%

Table F4.4: Impact on IL receipts at varying rates of IL and minimum threshold *(source: Authors').*

Bivariate Sensitivity Table: Impact on IL receipt (£ /m^2 of scheme area)

Minimum threshold	Levy rate (%)						
	20%	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
£700	£156	£235	£313	£391	£469	£548	£626
£800	£136	£205	£273	£341	£409	£478	£546
£900	£116	£175	£233	£291	£349	£408	£466
£1,000	£96	£145	£193	£241	£289	£338	£386
£1,100	£76	£115	£153	£191	£229	£268	£306
£1,200	£56	£85	£113	£141	£169	£198	£226
£1,300	£36	£55	£73	£91	£109	£128	£146

Table F4.5: Impact on land value estimate at varying base build costs and house prices (IL set at 50%) *(source: Authors').*

Bivariate Sensitivity Table: Impact on Land Value Estimate (£ /ha)

Base build costs (£ /m^2)	Market Value (£ /m^2)						
	£1,200	**£1,300**	**£1,400**	**£1,500**	**£1,600**	**£1,700**	**£1,800**
£500	£199,035	£266,036	£333,038	£400,040	£467,041	£534,043	£601,044
£600	£87,297	£154,298	£221,300	£288,301	£355,303	£422,304	£489,306
£700	-£24,442	£42,560	£109,561	£176,563	£243,564	£310,566	£377,567
£800	-£136,180	-£69,178	-£2,177	£64,825	£131,826	£198,828	£265,829
£900	-£247,918	-£180,917	-£113,915	-£46,914	£20,088	£87,089	£154,091
£1,000	-£359,657	-£292,655	-£225,654	-£158,652	-£91,650	-£24,649	£42,353
£1,100	-£471,395	-£404,393	-£337,392	-£270,390	-£203,389	-£136,387	-£69,386
£1,200	-£583,133	-£516,132	-£449,130	-£382,129	-£315,127	-£248,126	-£181,124

Appendix 2: Modelling principles and assumptions

Profit margin with finance or IRR?

The choice of financial performance metric and development appraisal method can determine whether a project, levy rate or affordable housing policy is interpreted as being financially viable. In practice, a range of approaches to development appraisal are used by market participants. One of the main divisions between real estate professionals has been between an appraisal approach that expresses the required return to the developer in terms of an Internal Rate of Return (IRR) compared to an approach that expresses the required return to the developer in terms of a profit margin as a proportion of a development project's value or costs. The latter approach also allows for financing costs on the assumption that the developer may borrow all or some of the required capital.

The latter approach would be considered as lacking robustness in mainstream project appraisal and is not used outside real estate development. However, to date, the viability guidance produced by government has tended to institutionalise in viability tests what is increasingly recognised, even within the real estate development sector, as inappropriate professional practice. The issue of timing of cash flows has provided to be a key issue when analysing the viability of phased, low-density developments that can begin to generate positive cash flow relatively early in the development period. The potential benefits in terms of financial returns are illustrated in the simplified (but representative) examples below.

Example 1 - All profits received at the end of the development period.

Year	**0**	**1**	**2**	**3**			
Land	-1	0	0	0			
Non-land costs	0	-1	-1	-1			
Revenues	0	0	0	5			
					IRR	*Profit*	*Profit margin %*
Net cash flow	**-1**	**-1**	**-1**	**4**	***15%***	***1.00***	***20%***

Example 2 - Profits received during the development period

Year	**0**	**1**	**2**	**3**			
Land	-1	0	0	0			
Non-land costs	0	-1	-1	-1			
Revenues	0	1.67	1.67	1.67			
					IRR	*Profit*	*Profit margin %*
Net cash flow	**-1**	**0.67**	**0.67**	**0.67**	***45%***	***1.00***	***20%***

Although the ‘profit margin with finance’ approach became embedded in viability guidance and PPGs, there has been longstanding criticism of the widespread use of simplistic profit margins incorporating finance costs in development appraisal. The persistence of such models in practice is hard to explain and suggests that the use by market participants of appraisal models regarded as theoretically weak is not a significant determinant of business performance. Often the uncertainty in the appraisal inputs means that there can be little gain by improving the theoretical robustness of the appraisal model.

However, the most recent professional guidance from the RICS (RICS, 2019) recommends that development appraisal methods using simple profit margins and incorporating finance should be avoided. It is widely accepted that financing decision should not influence a project’s value. The financing assumption used in the development appraisal approach incorporating a profit margin is highly simplified. The result is that most viability appraisals have assumed that developers incur substantial financing costs. However, these financial costs should not be included and effectively constitute an additional ‘hidden profit’ to developers in the appraisal models.

The RICS guidance states:

> *B1.2.8.7 Interest rates will vary depending on the level of debt and the way in which the project is financed using combinations of different kinds of debt including senior and mezzanine. The costs of the different types of debt should be assessed separately and deducted from the net income each period to create an accurate net of finance cash flow.*
>
> *B1.2.8.8 If it is required to appraise the cash flow with particular assumptions about the debt, this guidance note recommends that the market value of the site is assessed using both the market comparison approach and the residual valuation, assuming no debt and a project target rate of return. The debt analysis should be undertaken outside of the market valuation and the results of the two appraisals reported separately.*
>
> *B1.2.9.2 In a discounted cash flow, the nominal cash flows are discounted at the project target rate of return. This target rate is based on the required rate of return for a risk-free investment or project plus a premium for the risk undertaken. Development profit is therefore represented as a rate of return, not a single lump sum at some point in the development.*
>
> *B1.2.9.3 The target rate of return can vary significantly between projects and is extremely hard to determine.*

The latest RICS guidance on viability modelling was somewhat more tentative and seemed to defer to the PPG:

> *“Using the full range of development return metrics when undertaking FVAs is an integral part of determining an appropriate developer return based on the return on GDV identified in PPG paragraph 018”.*

If we look at the preliminary modelling above, the implications of the choice of appraisal approach can be more clearly appreciated. Using various assumptions about house prices and land value capture mechanisms, the low-density models estimate the land values for a 120 dwelling, three-hectare (NDA) greenfield site if the developer has a target (internal) rate of return of 15% per annum.

In a high house price area (average sale price - £5000/m²), this scheme is estimated to produce a land value of c. £3.8 million under the current land value capture regime if the target (internal) rate of return is 15% per annum. This equated to a cash profit of £4.76m in return for an investment by the developer of £16.5m. It produces a Return on Capital Employed of 29% - which would be regarded as quite healthy. However, it represents a profit margin of c13.5% of GDV which is below the level suggested in the PPG (15% of GDV).

For the four sites, alternative models have been produced that use the profit margin with finance costs approach. (They can be made available if necessary). If we follow the PPG and assume a 15% profit margin on GDV and allow for financing (this has been standard practice in viability modelling to date), considering the fact that the financing costs is largely notional and does not reflect the reality of development, the true profit margin as a % of GDV is 20.65% (assuming an interest rate of 6% per annum). In cash terms, it represents a profit of £6.89m. Not surprisingly, since the developer is taking out more of the value uplift (£6.9m rather than £4.76m), the mainstream financial performance metrics look even healthier for the developer– Return on Capital Employed is nearly 37% and IRR per annum is 25%. Volume housebuilders weighted average cost of capital (WACC) currently vary around 10%.

For high house price areas, the explicit and implicit financial performance embedded in a 15% of GDV profit margin provides relatively high rates of return using mainstream financial performance metrics for residential developers. However, even at this level of profit margin, land values should remain attractive to landowners at £3.14m per hectare of net developable land.

A key point here is that the seemingly generous assumptions about developer return at 15% of GDV could be changed to allow for a higher return to the landowner and/or additional land value capture by the local planning authority.

The assumptions of the profit margin/finance costs approach tend to become more problematic in areas with low house prices. Because the non-land development costs tend to be much closer to the GDV and land costs tend to be much lower, reasonable financial performance by mainstream metrics can appear unviable if a 15% profit margin as a % of GDV plus notional financing costs are required.

Looking at the same low-density project but putting it into a low house price area (GDV = £2000/m²), some land value capture seems viable if the developer is assumed to require an IRR of 15% per annum. Even, if the local planning authority captures c40% of the land value uplift, the land value is estimated at £473,000 per hectare of developable land. In return for investing £3.8m, the developer is expected to receive a profit of c. £955,000. The 15% IRR represents a Return on Capital Employed of c25%. However, at 5.62%, the profit margin as a % of GDV is extremely low relative to the 15% of GDV in the PPG.

If the 15% of GDV profit margin (and an interest rate of 6%) is imposed, the land value becomes negative as 15% of GDV represents over £2.5m. Little land value capture is viable if the required profit margin of 15% of GDV is imposed. In the absence of any land value capture and imposing 15% of GDV with 6% interest costs, the land value estimate is c. £228,000/ha of developable land. This equates to an IRR of c64% per annum and a ROCE of 96.6%. In return for investing c. £2.8m, the developer’s profit is c. 2.96m.

The key point here is that imposing assumptions (simple profit margins and finance costs) regarded as lacking robustness in mainstream project appraisal can make development that appears viable if benchmarked against mainstream performance metrics appear to be unviable.

The question of the IRR versus profit margin with finance costs is not so problematic with high density projects. Such projects tend to generate most revenues at the end of the project and the cash flow timing advantages of greenfield, low-density developments are not present. As a result, differences in the financial performance metrics produced by the two approaches are not so stark.

Assessing development viability

The discussion set out above provides the core principles by which we undertake the modelling component of this research.

Using a range of secondary data sources - CoStar, ONS resources, BCIS construction cost data and data internal to the local authorities with which we have worked - we seek to explore three scenarios: no land value capture, the extant system of S106 and CIL, the proposed Infrastructure Levy.

Across each scenario we set the Internal Rate of Return to the developer to be 15% to reflect the profit motive essential to stimulate a private development industry to undertake development.

With these modelling principles in place, the next chapter provides findings for the six case studies regarding variations in outcomes across the three modelling scenarios (no land value capture, the extant system, and the proposed IL) across a range of development typologies. These will mainly include a range of residential development projects in greenfield and brownfield sites with three different value bands. Informed by local knowledge from the local authorities, hypothetical schemes modelled will also include a logistics development, a strategic urban extension, student accommodation and a conversion of from office to residential under Permitted Development Rights.

Appendix 3: The current system: a brief history

Planning obligations (known colloquially as S106 agreements after the relevant clause in the principal Planning Act of 1990, the Town and Country Planning Act, 1990 as amended subsequently) have a long history (see Crook, Henneberry & Whitehead, 2016, for a detailed history). They were designed to secure by private contract between local planning authorities and developers matters that cannot be secured by conditions on planning permissions. Importantly, because they are private contracts, they are enforceable by both sides to any agreement. Originally used, from the 1930s onwards, to deal with matters relating to the carrying out of developments (for example restrictions of working hours) their purpose was expanded from the 1970s onwards because of local planning authorities taking the initiative to use these powers to require developers to contribute to the costs of infrastructure that new developments required such as new school classrooms and improvements to roads and transport.

The growth of these obligations (secured through S106 legal agreements) partly reflected the restricted capital funding available to public infrastructure providers (including local authorities) who negotiated with developers to supplement public funding. Over time the system evolved further with local planning authorities not obliged to seek central government approval when making agreements. But by the 1970s concerns had grown that local planning authorities were seeking contributions in ways that were not wholly connected with supporting development and were in effect getting developers to pay for a wide range of unrelated infrastructure. As a result, although the discretion planning authorities had to make agreements has not been removed, they have been required to ensure agreements are closely related to proposed developments by adhering to tests of their legitimacy and by ensuring that policies about seeking contributions are included within adopted local plans. Consequently, the costs sought by local planning authorities must be clearly related to the infrastructure needed by the development proposed, although it should be noted that the courts have held that a wide range of contributions can be sought, provided they are related to proposed developments and support it.

As well as seeking contributions to necessary infrastructure, planning authorities had started, in the 1980s, to get developers to include elements of new affordable homes in all market housing schemes requiring that a specific proportion of all new homes should be affordable. Initially this was sought when new development was being proposed on sites not included in development plans because the resultant uplift in land values if planning consent was granted provided enough value that could be used to fund new affordable homes. Following these local authority initiatives, government endorsed this approach in two steps. First it endorsed using it for small scale development in rural areas (so called rural exceptions sites) and second (and much more significantly) it endorsed using the approach for large scale development of market housing sites. In making this endorsement government stressed (and has continued to do so) that provision should be secured through on-site mixing of affordable with market homes thus achieving a government aim of creating more mixed communities (although off-site provision via commuted payments is not ruled out). To secure such contributions planning authorities were expected to set out in their adopted local plans an overall policy of the numbers of new affordable homes needed over a planned period and related policies about the percentages of affordable homes needed on new developments.

Since this endorsement in the late 1980s the use of planning obligations and developer contributions for new affordable homes has become commonplace (with new and consolidating legislation in the 1990 Act), although the details of what can and cannot be secured has changed over the years especially with respect to the size of sites where contributions may be negotiated. Likewise, the types of affordable homes secured have varied and in most recent years there have been more secured through shared ownership and affordable rented than through social rented housing partly because of viability issues for developers (affordable housing providers will pay more for these than social rented homes) and partly because planning authorities have sought ever higher proportions of affordable homes as part of market sites which likewise creates viability issues for developers. Importantly the bodies regulating and funding registered providers of new affordable homes have had a default policy that they will not normally pay grants towards new homes secured through S106 agreements in the expectation that private funding (i.e., reduced land prices received by landowners) has been substituted for public grant.

At the same time as the system has evolved to embrace off-site contributions to infrastructure and on-site contributions of new affordable homes there have been many changes to the details of the policy, including for example to definitions of affordable homes (and most recently the government requiring a specific minimum percentage of First Homes to be included in the mix) and the minimum site size below which planning authorities are not expected to secure affordable homes contributions. Many of the other changes have been designed to speed up the system including many planning authorities moving some of the negotiated contributions to fixed charges (e.g., £x per sq. m of new floor-space for education) and using standardised legal agreements. Developers have powers to renegotiate agreements if market circumstances change threatening viability. These powers were expanded following the global financial crisis (see below).

Some more fundamental changes were consulted on by government, all designed to speed up the system and reduce uncertainty. The most significant of these was the proposed Planning Gain Supplement, one of the recommendations made by Dame Kate Barker in her report on housing supply for the Treasury. This would have formally ‘taxed’ the increase in development value following planning consent by a modest levy but retained S106 planning obligations for site mitigation work and for the provision of affordable housing. After extensive consultations, her proposal was not implemented, and one of the criticisms of the approach was that it would formally have created a tax on land value uplift; another was that the rate would have been nationally determined and collected.

In its place in 2008 the government introduced a Community Infrastructure Levy (hereafter 'CIL'). This gave local authorities discretion to charge CIL running alongside S106 but potentially requiring contributions from all types of development. The authorising legislation is in the Planning Act 2008 and CIL came into operation in 2010. The intention was that a CIL charge on new development would help fund non- site-specific (including sub regional) infrastructure, leaving S106 to deal with affordable housing and contributions to site mitigation costs. In setting charges planning authorities are obliged to subject draft charging schedules to public scrutiny and inquiry and provide mechanisms for uprating charges in relation to cost increases. To avoid local authorities 'double dipping' into development value, lists of what could and could not be used for CIL funds and for S106 were drawn up. Over time a range of exemptions for CIL charges were drawn up and planning authorities became obliged to provide some of their CIL income to help local groups (including parish councils) to fund locally needed infrastructure. In drawing up draft CIL schedules (as with defining S106 requirements) planning authorities need to have an eye on their impact on development viability, not least because (depending on overall levels of market demand and land values) a high CIL requirement might lead to difficulties in securing levels of affordable housing (and of course vice versa). In London special arrangements were set up for a Mayoral CIL to help fund Crossrail. As of now none of the combined authorities outside Greater London have implemented such a CIL charge, although several are examining plans to do so (e.g., Greater Manchester Combined Authority).

Appendix 4: Glossary

Affordable housing

Affordable housing includes a range of non-market tenures including social rented, affordable rented and intermediate rented housing. Whilst it may be developed directly by registered providers or the private sector, for the purposes of this study it is only housing that is agreed through a planning obligation.

CIL - Community Infrastructure Levy

A levy allowing local authorities to raise funds from owners or developers of land undertaking new building projects in their areas. The Community Infrastructure Levy is a tool for local authorities to help deliver infrastructure to support the development of their area.

LAHS - Local Authority Housing Statistics

The LAHS is an annual data collection covering all local authorities and covers a wide range of housing topics; for the purposes of this study the survey collects data on the supply of affordable housing.

LPA - Local Planning Authority

Local planning authorities are the public authority whose duty it is to carry out specific planning functions in a particular area. The planning system includes three tiers of local government in England, but in this instance the focus is on district councils and London borough councils (whether two tier or unitary authorities) as Local Planning Authorities (county councils, Broads authority, national park authorities and the Greater London Authority are identified separately).

PA - Planning agreement

A legal agreement between local planning authority and developer, which sets out the individual obligations that have been agreed.

PO - Planning obligation

A legally enforceable obligation within a planning agreement, normally entered into under section 106 of the Town and Country Planning Act 1990, to mitigate the impacts of a development proposal.

PDR - Permitted Development Right

A national grant of planning permission. The rights are set out in the Town and Country Planning (General Permitted Development) (England) Order 2015, as amended. Permitted development rights for the change of use to residential are subject to prior approval by the local planning authority.

S106 - Section 106 agreement

Section 106 of the Town and Country Planning Act 1990. This is the primary legislation under which local planning authorities are able to secure planning obligations as a signed agreement between the developer and the LPA. The Act was amended in 2013; where referred to in relation to 2016/17 the amendment to the Act is assumed.

S278 - Section 278 agreement

Section 278 of the Highways Act 1980. This is further legislation under which local planning authorities (as highway authorities)are able to secure planning obligations as a signed agreement between the developer and the LPA related to highways related works.

Appendix 5: LPAs grouped by LPA family type and CIL charging status

The LPA family typology

Grouping LPAs together by shared characteristics rather than a straightforward geography (such as regions) was first proposed by Vickers et al. (2003) using 2001 census data. This approach allows for meaningful comparisons between LPAs that are geographically distant from one another but are similar in many other respects, such as household composition. The six original families created by Vickers et al (2003) were (with the original numbers of LPA member authorities in brackets): Established Urban Centres (30); Urban England (46); Rural Towns (119); Rural England (57); Prosperous Britain (76); and Urban London (26). Prosperous Britain was re-named 'Commuter Belt' in the 2011/12 study onwards.

In 2019 there was a restructuring of local authorities in England. Whilst most authorities remained unaltered there were changes in three counties. In Dorset two new unitary authorities, Dorset Council and Bournemouth, Christchurch and Poole Council, were created from seven previous authorities, abolishing the two-tier structure in the county. In Somerset and Suffolk three separate pairs of districts were combined to create three new authorities, Somerset West and Taunton Council, East Suffolk Council and West Suffolk Council, whilst retaining the two-tier structure. This resulted in a reduction in the total number of local authorities from 326 to 317.

Urban England

LPA name	CIL?	LPA name	CIL?	LPA name	CIL?
Ashfield	No	Derby	No	Plymouth	Yes
Barnsley	No	Doncaster	No	Portsmouth	Yes
Barrow-in-Furness	No	Exeter	Yes	Preston	Yes
Bolsover	No	Halton	No	Redcar and Cleveland	No
Brighton & Hove	No	Hartlepool	No	Rotherham	Yes
Bristol	Yes	Ipswich	No	Sefton	No
Cambridge	No	Lancaster	No	Sheffield	Yes
Canterbury	No	Leeds	Yes	Southampton	Yes
Chesterfield	Yes	Lincoln	Yes	St Helens	No
Copeland	No	Mansfield	No	Stockton-on-Tees	No
County Durham	No	North East Lincolnshire	No	Wakefield	Yes
Coventry	No	North Tyneside	Yes	Wigan	No
Darlington	No	Oxford	Yes	Wirral	No

Established urban centres

LPA name	CIL?	LPA name	CIL?	LPA name	CIL?
Barking and Dagenham	Yes	Kirklees	No	Pendle	No
Birmingham	Yes	Knowsley	No	Rochdale	No
Blackburn with Darwen	No	Leicester	No	Salford	No
Bolton	No	Liverpool	No	Sandwell	Yes
Bradford	Yes	Manchester	No	South Tyneside	No
Burnley	No	Middlesbrough	No	Stoke-on-Trent	No
Calderdale	No	Newcastle upon Tyne	Yes	Sunderland	No
Gateshead	Yes	Norwich	Yes	Tameside	No
Hyndburn	No	Nottingham	No	Walsall	No
Kingston upon Hull	Yes	Oldham	No	Wolverhampton	No

Rural towns

LPA name	CIL?	LPA name	CIL?	LPA name	CIL?
Amber Valley	No	Gravesham	No	Rugby	No
Basildon	No	Harlow	No	Solihull	Yes
Bassetlaw	Yes	Havant	Yes	South Ribble	Yes
Bexley	Yes	Havering	No	Stafford	No
Broxbourne	No	Herefordshire	No	Stevenage	No
Broxtowe	No	High Peak	No	Stockport	No
Bury	No	Hinckley and Bosworth	No	Swale	No
Cannock Chase	Yes	Kettering	No	Swindon	Yes
Cheshire East	Yes	Newark & Sherwood	Yes	Tamworth	Yes
Chorley	Yes	Newcastle-under-Lyme	No	The Wrekin (and Telford)	No
Corby	No	North East Derbyshire	No	Thurrock	No
Crawley	Yes	North Lincolnshire	No	Trafford	Yes
Dartford	Yes	North Warwickshire	No	Warrington	No
Dudley	Yes	North West Leicester	No	Wellingborough	No
East Staffordshire	No	Northampton	Yes	West Lancashire	Yes
Erewash	No	Nuneaton and Bedworth	No	Worcester	Yes
Gedling	Yes	Peterborough	Yes	Wyre Forest	No

Gloucester	Yes	Redditch	No		
Gosport	Yes	Rossendale	No		

London

LPA name	CIL?	LPA name	CIL?	LPA name	CIL?
Barnet	Yes	Hammersmith and Fulham	Yes	Newham	Yes
Brent	Yes	Haringey	Yes	Redbridge	Yes
Camden	Yes	Harrow	Yes	Slough	No
City of London	Yes	Hounslow	Yes	Southwark	Yes
Croydon	Yes	Islington	Yes	Tower Hamlets	Yes
Ealing	No	Kensington and Chelsea	Yes	Waltham Forest	Yes
Enfield	Yes	Lambeth	Yes	Wandsworth	Yes
Greenwich	Yes	Lewisham	Yes	Westminster	Yes
Hackney	Yes	Luton	No		

Commuter belt

LPA name	CIL?	LPA name	CIL?	LPA name	CIL?
Aylesbury Vale	No	Hart	No	Spelthorne	No
Basingstoke and Deane	Yes	Hertsmere	Yes	St Albans	No
Bath and North East Somerset	Yes	Hillingdon	Yes	Stratford-on-Avon	Yes
Bedford	Yes	Horsham	Yes	Surrey Heath	Yes
Bracknell Forest	Yes	Huntingdonshire	Yes	Sutton	No
Brentwood	No	Kingston upon Thames	Yes	Tandridge	Yes
Bromley	No	Maidstone	Yes	Tendring	Yes
Castle Point	No	Merton	No	Three Rivers	Yes
Central Bedfordshire	No	Mid Sussex	No	Tonbridge and Malling	No
Charnwood	No	Milton Keynes	Yes	Uttlesford	No
Cheltenham	Yes	Mole Valley	Yes	Vale of White Horse	Yes
Cherwell	No	North Hertfordshire	Yes	Warwick	Yes
Cheshire West and Chester	Yes	Oadby and Wigston	No	Watford	Yes
Chiltern	No	Reading	Yes	Waverley	Yes
Colchester	No	Reigate and Banstead	No	Welwyn Hatfield	No

Dacorum	Yes	Richmond upon Thames	No	West Berkshire	Yes
Daventry	Yes	Runnymede	No	West Oxfordshire	No
East Hampshire	Yes	Rushcliffe	No	Winchester	Yes
East Hertfordshire	No	Rushmoor	Yes	Windsor and Maidenhead	Yes
Eastleigh	No	Sevenoaks	Yes	Woking	Yes
Elmbridge	Yes	South Bucks	No	Wokingham	Yes
Epping Forest	No	South Cambridgeshire	No	Wycombe	Yes
Epsom and Ewell	Yes	South Gloucestershire	No	York	No
Guildford	No	South Northamptonshire	Yes		
Harborough	No	South Oxfordshire	Yes		

Rural England

LPA name	CIL?	LPA name	CIL?	LPA name	CIL?
Adur	No	Folkestone and Hythe	Yes	Sedgemoor	No
Allerdale	No	Forest of Dean	No	Selby	Yes
Arun	No	Fylde	No	Shropshire	No
Ashford	No	Great Yarmouth	No	Somerset West and Taunton Deane	No
Babergh	Yes	Hambleton	Yes	South Derbyshire	Yes
Blaby	No	Harrogate	No	South Hams	No
Blackpool	No	Hastings	No	South Holland	No
Boston	No	Isle of Wight	No	South Kesteven	Yes
Bournemouth, Christchurch and Poole	Yes	Isles of Scilly	No	South Lakeland	Yes
Braintree	No	King's Lynn and West Norfolk	Yes	South Norfolk	Yes
Breckland	No	Lewes	Yes	South Somerset	No
Broadland	Yes	Lichfield	Yes	South Staffordshire	No
Bromsgrove	No	Maldon	No	Southend-on-Sea	Yes
Carlisle	No	Malvern Hills	Yes	Staffordshire Moorlands	No
Chelmsford	Yes	Medway	No	Stroud	No
Chichester	Yes	Melton	No	Teignbridge	No
Cornwall	Yes	Mendip	Yes	Telford and Wrekin	Yes

Cotswold	Yes	Mid Devon	Yes	Test Valley	No
Craven	No	Mid Suffolk	No	Tewkesbury	No
Derbyshire Dales	No	New Forest	Yes	Torbay	Yes
Dorset	Yes	North Devon	No	Torridge	No
Dover	No	North Kesteven	No	Tunbridge Wells	No
East Cambridgeshire	Yes	North Norfolk	Yes	Wealden	Yes
East Devon	Yes	North Somerset	Yes	West Devon	No
East Lindsey	No	Northumberland	Yes	West Lindsey	Yes
East Northamptonshire	No	Ribble Valley	Yes	West Suffolk	No
East Riding of Yorkshire	No	Richmondshire	No	Wiltshire	Yes
East Suffolk	Yes	Rochford	No	Worthing	Yes
Eastbourne	Yes	Rotherham	No	Wychavon	Yes
Eden	No	Rutland	Yes	Wyre	No
Fareham	Yes	Ryedale	No		
Fenland	No	Scarborough	Yes		

National Parks and Development Corporations

LPA name	CIL?	LPA name	CIL?	LPA name	CIL?
Dartmoor National Park LPA	No	New Forest National Park LPA	No	South Downs National Park LPA	Yes
Ebbsfleet Development LPA	No	North York Moors National Park LPA	No	The Broads Authority LPA	No
Exmoor National Park LPA	No	Northumberland National Park LPA	No	Yorkshire Dales National Park LPA	No
Lake District National Park LPA	No	Old Oak and Park Royal Development Corporation LPA	No		
London Legacy Development Corporation LPA	Yes	Peak District National Park LPA	No		