THE HOUSING DATABASE MADE VISIBLE

An artist and activist-led investigation into relational machines, aspirations, and urban regeneration

Tom Keene

June 2022

Thesis submitted for the degreee of
Doctor of Philosophy (PhD)
Design Department
Goldsmiths College, University of London

Declaration of Authorship

I hereby declare that this thesis and the work presented in it is entirely my own. Where I have consulted the work of others, this is always clearly stated.

Tom Keene

Acknowledgements

My sincerest thanks to my supervisors Alex Wilkie and Graham Harwood who have patiently guided me though this project as it evolved through my son's early childhood, the birth of my daughter, a life-threatening illness, and a global pandemic. Their guidance has taught me to write academically and given me confidence in the importance of *making with* technical objects to understand their societal, cultural, and personal implications.

This project would not have been possible without the generosity, support, and contribution of Cressingham residents. Particularly Andy, Eileen, Gerlinde, Michael, Pam, Joanne, and Mariana. Their energy and good humour have been vital resources to draw from during what has often been an emotionally draining project. Thanks also to the 35% campaign, Southwark Notes, Architects for Social Housing, Save Central Hill, Focus E15, and many other housing campaigns the herculean effort and output of which helped me comprehend dizzying layers of government and commerce within urban regeneration and its impact on people's lives. Special thanks to Loretta Lees, Lisa Mackenzie, Paul Watt, Joe Penny and many other scholars whose academic work and vocal support of @SaveCressingham deserves credit beyond the references in this thesis. My apologies to those I have not thanked who are far too numerous to mention.

My thanks to the Design Star Centre for Doctoral Training for funding this project. Thanks also to those who provided feedback on early drafts of the text, including Kypros Kyprianou, Robert Deakin, Suzanne Keene, and my upgrade examiners Sheila Sheik and Bill Gaver who helped me recognise dead-ends, errors, and a nuances of language to which my dyslexia often makes me blind. Further thanks to my fellow PhD students within Goldsmiths' Department of Design who provided a supportive environment in which to share the ups and downs of this project.

Particular thanks to my mother, Suzanne Keene, who inspired my life-long interest in technology that originated with her BBC microcomputer. Thanks also to my father, Derek Keene, who imparted me with a deep respect for making as a way to think about and understand the world. I am sad that he will not get to read this text though I know how proud he was that I undertook this task.

Most importantly, I would like to thank my partner Caryl, who has supported this project in immeasurable ways and, through our many discussions, opened my eyes to the key argument of this thesis. Finally, thanks to my children Eryn and Eiros, who have kept me to a strict routine and taught me so much about the important things in life. In many ways, this thesis documents elements of their childhood, so I hope it provides a fitting record of that time.

Abstract

This research project investigates the role of government database technologies within highly contested urban regeneration schemes that demolish homes and displace communities. Such databases are unacknowledged, poorly understood, and semi-invisible to citizens and residents. As a case study, this project focuses on housing databases employed by Lambeth Borough Council in South West London to manage over 33,000 tenant, leasehold, and freehold homes. These databases inform Lambeth's proposals to demolish the 306 properties on Cressingham Gardens Estate (Cressingham), including my own home. I argue that Lambeth's housing databases are intimidatingly complex, inaccessible, distributed across network infrastructure, and ultimately unknowable because they constantly change. To address this complexity, I draw on work from philosophers Gilbert Simondon and Michel Foucault to theorise Lambeth's databases as evolving collectives of human and technical components that shape government, economic, and individual aspirations for Cressingham. Following John Law, the project employs a method assemblage approach to research that incorporates a critical technical practice, social and cultural theory, action research methods, participatory art and design, computer programming, and activism as intersecting modes of enquiry in Lambeth's database systems. Through this enquiry I explore how human aspirations to demolish or refurbish Cressingham are mediated by the tables, primary keys, and network infrastructure of Lambeth's database systems. The outcomes of this work include diagrams, workshops, contraptions, programming code, algorithms, a bike trailer, and contributions to the @SaveCressingham activist campaign. This assemblage of artist and activist practice exposes and critiques the technological, political, ethical, interpersonal, and material implications of Lambeth's database technologies on residents' lives.

Table of contents

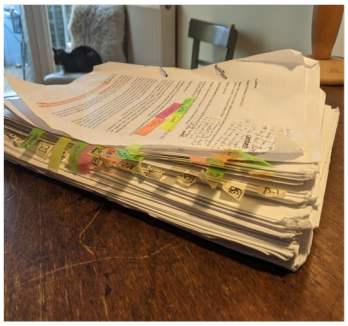
List of Figures

List of abbreviations

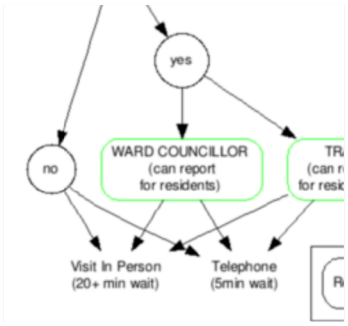
AI	Artificial Intelligence
AR	Action Research
ASH	Architects for Social Housing
CAE	Critical Art Ensemble
CGRMC	Cressingham Gardens Resident Management CIC
CIC	Community Interest Company
CTP	Critical Technical Practice
DCLG	Department for Communities and Local Government
DIY	Do it Yourself
DIWO	Do it With Others
GPL	General Public License
FOIA	Freedom of Information Act
FLOSS	Free (Libre) Open-Source Software
GUI	Graphical User Interface
HARMS	Housing Asset Repairs Management Systems
HTTP	Hypertext Transfer Protocol
IP	Internet Protocol
IT	Information Technology
JSON	JavaScript Object Notation
MP	Member of Parliament
OS	Operating System
PD	Participatory Design
RTM	Right to Manage
RTT	Right to Transfer
SCS	Service Charge Statement
SOR	Schedule of Rates
SPV	Special Purpose Vehicle
STS	Science and Technology Studies
SQL	Structured Query Language
UPRN	Unique Property Reference Number
URL	Uniform Resource Locator
XML	eXtensible Markup Language

List of activities

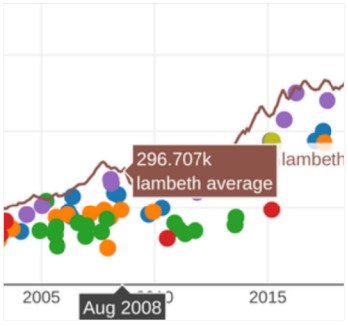
The following is an index of the main activities undertaken during this project that sit between research, art, design, technical, personal, and activist endeavours and artifacts.



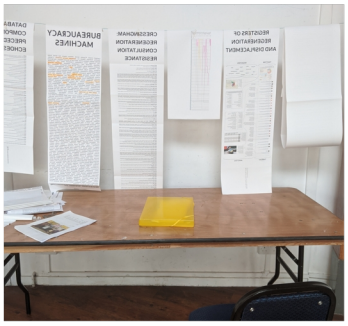
Cabinet Document Parser: Code that automatically downloads Lambeth's entire corpus of decision-making documents from 1999 to the present day (chapter 4 and fig. 44).



Impossible Code/Diagram: An attempt to diagram Lambeth's database systems as a site of interconnected databases, locations, practices, codes, and humans (chapter 4 and fig. 39).

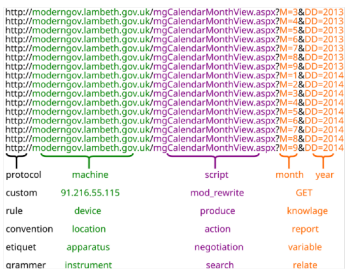


Land value plot: Interactive diagram displaying historic and predicted sales figures for Cressingham(chapter 6 and fig. 109).

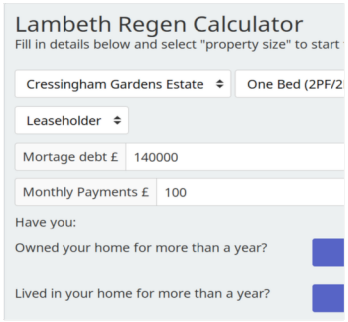


lookup_tables: Lists that document repairs issues, consultations, technical and legislative relations, and histories of database technologies recognisable in Lambeth (chapter 4 and figs. 56., 65., 91., 17.).

Paper Houses: Making paper houses out of SOR codes within a public performance (chaper 5 and fig. 74.).



Poetic URL: Unpacking the URL from Lambeth's online calendar and archive of cabinet and planning meetings (chapter 4 and fig. 46).

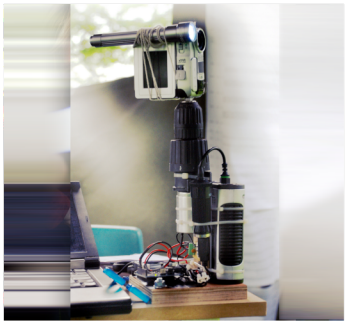


Regen Calculator: An online form that applies the formal logic of code to ambiguous financial viability assessments (fig. chapter 4 and fig. 106.).

Regen Cheat Sheet (chapter 6): A collaboratively written guide to help residents cope with urban regeneration (chapter 6 and fig. 37.).

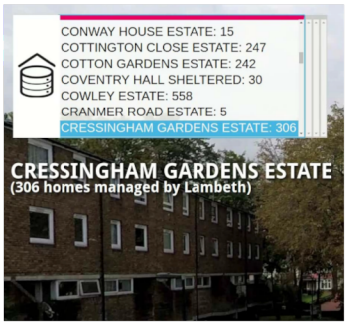
```
MOST EXPENSIVE ESTATES TO MAINTAIN
SELECT
   A.EstateName,
   A.EstateCode,
   B.props,
   C.TotalCost,
   C.TotalCost/B.props as perproperty
FROM 'workorders' A
LEFT JOIN
  (SELECT count(property_ref) as props, estate
  GROUP by estate_id) B
  ON A.EstateCode=B.estate_id
LEFT JOIN
  (SELECT EstateCode, sum(TotalCostNow) as Tot
  'workorders' GROUP by EstateName) C
  ON A.EstateCode=C.EstateCode
WHERE WOStatus="Closed"
```

Regeneration Algorithm: An SQL query calculating average maintenance costs for every housing estate in Lambeth (chapter 6 and fig. 103.).



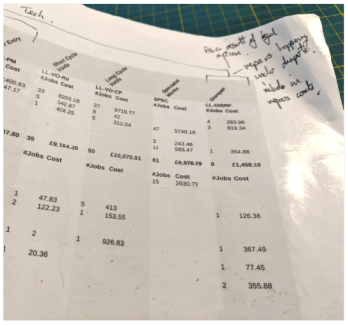
Search Drill: A drill, laptop, and camera contraption that explores hidden SOR codes (chapter 5 and fig. 76.).

Service Charge Parser: A programming script that extracts data from homeowner service charge bills and helped contest £127,000 of repairs (chapter 5 and fig. 69.).



Shadow Database: A resident-led recreation of Lambeth's housing database systems that overlays video footage with housing data (chapter 6 and figs. 92., 115.).

Special Purpose Vehicle: A bicycle trailer that recorded video footage of Cressingham while helping audit repairs and look after my children (chapter 6 and fig. 112.).



Spreadsheet Schema: A spreadsheet used to reverse-engineer hidden database structures employed by Lambeth in the management of their housing stock (chapter four and fig. 86.).

Theoretical & technical terms

This glossary merges technical and theoretical terms to challenge any hierarchy between these different kinds of knowledge.

Aspirational database
A concept developed in chapter two that articulates how database technologies recursively shape the aspirations of government, institutions, political parties, and individuals until it becomes difficult to determine who is directing whom.

Command-line
A process of issuing commands to computer programs through lines of text rather than a graphical user interface.

Data-type
The format of data storage that can hold a distinct type or range of values including integers (whole number), floating points (number with a decimal point), timestamp (date), boolean value (true or false), and strings (freeform text).

Discursive space
A Foucauldian term that identifies groups of statements and discourses within technical, material, economic, social, spatial, or political events.

HARMS
A fictional device, and acronym for *Housing Asset Repairs Management System*, that addresses the unknowable aspects of Lambeth's database that involve abstract, material, social, cultural and human components. HARMS also serves as a reminder that Lambeth's database systems can cause anxiety and distress.

Milieu
A concept drawn from French philosopher Gilbert Simondon that I employ to describe the associated more-than-technical environment of a database that can sustain, destabilise, or evolve its existence.

More-than-technical
Points to things that can appear human, machine, social, cultural, political, or technological where the distinction between these terms is not always clear.

Northgate
Lambeth's primary housing database system used to manage general repairs and maintenance along with large-scale *capital works* repairs.

Power/Knowledge
A concept drawn from French philosopher Michel Foucault that can explain how technical objects are involved in the governance of behaviour and the production of knowledge.

Performance
A term that describes how technical objects are involved in performances of power that take form in association with the formation of knowledge.

Primary-key
A unique identifier for each row of data in a relational database table.

Repairs Job
An abstract technical object that represents a repair recorded in Lambeth's database systems, referenced by a primary key and containing a description, date, cost, and other fields of data.

Relational database
A type of database where any row of data can refer to any other. This is contrast to a hierarchical database in which each data-entry has a parent-child relationship.

Relational machine
A concept defined by the artist and theorist Graham Harwood that describes a database as the collective endeavour of humans and machines to systematically gather information.

Relational model
An abstract three-layer architecture for the relational database. The internal layer describes how and where data are stored. The conceptual layer defines how data are organised within a schema. The external layer specifies how data can be viewed.

Schema
Defines the formal structure of a relational database through a database vocabulary that defines tables, columns, data-types, and primary-keys.

SQL
A programming language used to ask questions of a relational database and return a result.

Technical object
For Simondon, a technical object is an evolutionary process involving different modes of abstract and material existence and any number of technical elements, individuals or collectives that operate as a working structure.

Technicity
Derived from Simondon, this concept describes the essence of a technical object that is recognisable through its modes of existence and also triggers ideas in humans for its own optimisation.

Digital archive

I provide an index to a digital archive which accompanies this thesis below. The archive includes significant artefacts that I created as part of this research project, including programming code, images, and text. I did not create this code as polished or complete software. Instead, it documents a process of thinking and making with database technologies as my response to specific contexts, temporalities, and demands.

Cabinet_document_parser
A *grabdocs.py* command-line script that grabs HTML pages from Lambeth's calendar of council meetings extracts a list of documents from the HTML, then downloads a copy of all the documents.

Land_value_plot
An HTML graph that displays UK land registry data for homes on Cressingham. This directory also contains code that automatically grabs land registry data and combines it with Cressingham data.

Lookup_tables
A command-line script that automatically converts markdown formatted files into the fold-out timelines in this thesis.

Regen_calculator
An HTML form that exposes the logic of Lambeth's Key Guarantees, financial viability calculations, and buy back valuations.

Search_drill
Two experimental command-line interfaces that I wrote in the python programming language. TentApp.py provides a search interface to SOR codes and controls an associated microcontroller. DrillBox.py displays repair data and controls a motor connected to a Raspberry Pi computer.

Service_charge_parser
Software that converts PDF versions of Lambeth's service charge statements into a comma separated value format.

Shadow_database
A browser-based application that displays housing data for all homes managed by Lambeth council.

www.db-estate.co.uk
A documentation website that operates as something between an artist's sketchbook, designer's portfolio, technical test space, activist resource, and diagram of my engagement with Lambeth.

Outline and presentation

Research questions

Chapters one and two provide entry points into a central research question and three subsidiary questions. Chapter three explores these questions by defining my approach to researching databases used by Lambeth Borough Council (henceforth Lambeth) in the management of their housing stock. Chapters four through to six then report on and analyse my engagement with these database systems in relation to these questions. My central research question is:

> *How can thinking and acting with housing database technologies reveal and intervene in issues of participation and democracy within processes of urban regeneration?*

Which, in turn, leads to three subsidiary research questions. First, how can artist and activist-led research engage with and expose a technical object that is organised by continually changing, inaccessible, ambiguous, and unknowable abstract logic and associations? Second, how can artist and activist-led research explain conflicting aspirations within Lambeth to repair, demolish, and displace? Third, what human and technical collectives can support residents' aspirations to protect Cressingham rather than destroy homes and break up communities?

Readership and contributions

This thesis has been written with many types of reader in mind. My theoretical and practical approach provides novel methods for any artist, activist, or researcher to engage with the complexities of government databases and those used by other kinds of organisation. These methods offer ways to engage with database technologies as collectives of human, software, hardware, and associated components that endeavour for all kinds of action. I argue that human (e.g., Lambeth staff or residents) aspirations associated with this endeavour are mediated and orientated by the technical capacities of each component. Lastly, this doctoral research project highlights the potential for further research that explores the politics of participation, community, and government through the intersections of art, design, activism, and technology.

This work makes a substantive contribution to the fields of software studies, critical making, and connects with STS, by reporting on the practical application of theories of technology within a politically charged live setting. This project adds to a growing body of scholarship that engages with or extends the work of Simondon (e.g., Combes, 1999; Lucchese, 2009; Mitchell, 2012; Hui, 2016; Bardin et al., 2019), as well as the field of urban studies through my introduction of an innovative approach to conceptualising and engaging with issues of urban regeneration and the role of technical objects in such processes. While technological and theoretical terminology may

seem alien to some, such as residents or the non-technical, I aim to communicate multiple registers of the urban space that encompass the technical, intrapersonal, democratic, and more. Here, the upshot of thinking with and developing Simondon's concept technicity when undertaking practice was that I could combine technical and conceptual language − across domains of computer science and philosophy − to articulate and observe how seemingly benign technical objects and practices actually and concretely contribute to the politics of urban regeneration.

Lastly, this thesis contributes to scholarly and social justice activities that engage with data and activism. An example of this work is The Data Justice Lab based in Cardiff who run an international conference exploring research on, and practices of, social justice in an age of datafication. This research project also contributes to the work of arts, designers, and researchers who engage with participatory or critical approaches to technology and social change such as those championed by arts organisations Arts Catalyst and Furtherfield both of which are based in the UK. Finally, this work contributes to emergent and existing activist campaigns that continue to fight against the worst effects of urban regeneration.

Chapter outline

Chapter 1, *Living with the regeneration machine*, introduces Cressingham Gardens Estate and my personal experience of Lambeth's programme of urban regeneration. The chapter outlines how artist and activist-led research can investigate the implications of Lambeth's housing database technologies on residents' lives. I discuss how the term *aspiration*, the acronym *HARMS*, and my concept of the *aspirational database* can address the ever-changing, invisible, and ambiguous associations of Lambeth's housing databases technologies. Finally, I introduce the relational model, which is a formal definition of the relational database, to illuminate how the technical specifics of computer hardware and software has democratic, personal, and ethical implications on Cressingham.

Chapter 2, *From technical object to aspirational database*, is organised in four sections comprising a review of critical literature that crosses the fields of software studies, urban studies, computer science, philosophies of technology, and critical technical practice. I examine this literature to elucidate the political, democratic, and ethical implications of relational databases. I discuss Harwood's (2013, p.18) concept of the relational machine to consider how an abstract relational model organises humans and machines in a systematic collection of information. I then draw from Michel Foucault's concept of power/knowledge to theorise how technical objects govern behaviour while they produce knowledge. Finally, I turn to Simondon's (2016) theory of individuation and his concepts of *technicity*, *the technical individual*, *milieu*, and *phasing* to describe how human aspirations are mediated by database technologies within a world of repairs, maintenance, and urban regeneration.

Chapter 3, *Methods for a live enquiry*, explains how to conduct artist and activist-led research within a live activist setting. I locate my methods in a method assemblage (Law, 2004) approach to research

that incorporates a critical technical practice (Agre, 1997). I describe how I undertake intersecting art, activist, making, design, and programming activities that involve making diagrams, annotation, workshops, building contraptions, and auditing data. These activities combine with theoretical, historical, and technical research to shape an enquiry into Lambeth's database technologies. I discuss the influence of action research methodology and the European/Scandinavian tradition of participatory design, then identify how art methods such as defamiliarisation, dysfunction, amateur making, engineering, and humour draw attention to a field of social and technical relations. I discuss how these methods are informed by artists such as *Heath Bunting* and *YoHA* then outline the ethical implications of this project, where my identity as an artist, resident, and activist precedes my role as a researcher.

Chapter 4 *Revealing machines* analyses three research activities that include *An Impossible Code/Diagram*, *A Calendar View*, and *the lookup_tables*. An Impossible Code/Diagram is an attempt to create a technical diagram of Lambeth's database systems. A Calendar View chronicles my investigation into how database and network architectures organise Lambeth's bureaucracy. The lookup_tables investigate the human impact of everyday list-making on residents' lives. Through my analysis, I draw from concepts of the relational machine (Harwood, 2013), human-machine discourse (Foucault, 2002, pp.49, 94; Goffey, 2008, p.18) and evolving technical objects (Simondon, 2016) to argue that technical standardisation is a mode of power implicated in human emotion and issues of transparency and accountability on Cressingham.

Chapter 5, *Abstract objects*, reports three intersecting research activities and objects. *Service Charge Parser* is a programming script that assisted Cressingham residents in their efforts to contest £127,000 of repairs undertaken by Lambeth. *SOR codes, Paper Houses, and a Search Drill* involved a workshop within a public performance that materialised hidden codes that underpin every Repairs Job. *Spreadsheet Schema* was a resident-led effort to comprehend how Lambeth organises itself around the database schemas in Lambeth. I discuss these research activities in relation to my theorisation of *Service Charge Statements*, *Repairs Jobs*, and *Schedule of Rates Codes* as abstract technical objects on Cressingham. I argue that these objects emerge from database discourses or vocabularies that define domains of knowledge and action. I conclude that this discourse carries potential to work both for and against residents' concerns which questions the role of the database as an apparatus of total government control.

Chapter 6, *Alternative aspirations*, analyses the space between metric precision and ambiguity within Lambeth's maintenance and regeneration practices. First, I discuss the technical concept of a database view in relation to philosophical concepts of a *diagram of power*, *the gaze* (Foucault, 1995, pp.171–172), *technicity*, and *milieu* (Simondon, 2016). I then apply these concepts to my analysis of three research activities. First, the *Shadow Database* exposes how a resident-led database can exercise control over Cressingham. Second, the *Regen Calculator* explores how Lambeth's finan-

cial viability assessments marginalise residents views and understanding of Cressingham. Third, the *Special Purpose Vehicle*, introduces a bicycle trailer − with reference to intersectional feminist principles (D'Ignazio and Klein, 2020b) − as a playful inquiry into Lambeth's databases and issues of resident labour, family life, and democratic participation. I conclude by discussing how alternative socio-technical configurations might bring continuous modes of resident-led democracy and control into existence.

Chapter 7, *Towards an ethical database*, first outlines the current status of Cressingham. The second section then focuses discussion on three key themes of *multiplicity*, *ambiguity*, and *accountability* and subsidiary themes of *acceleration*, *precision*, and *labour*, to revisit the research questions in relation to the concept of *aspirational database* and methods of *artist and activist-led research* developed through earlier chapters. The second section discusses the empirical outcomes of this project in relation to the key themes. The final section then assesses the potential readership of this thesis including activists, artists, designers, urban studies scholars, activists, and those working across domains of software studies and within a critical technical practice and identifies new methodological and theoretical directions for this project.

Presentation

Throughout this thesis I use illustrative figures to point to a multiplicity of association with Lambeth's database systems and gesture to the so-much-more out there. This approach was inspired by Anna Tsing's (2015) *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*, in which she uses imagery to point towards things that she cannot entirely explain. I weave snippets of code, handwritten notes, photographs, partially completed diagrams, screenshots, and timelines into this thesis to provide a glimpse of a world I have inhabited since 2012.

The substantive and hidden labour of activism involves determining how statements made by Lambeth about Cressingham emerge from a multitude of technical, legislative, democratic, and party-political processes. These processes are difficult to understand or figure, and the mental impact of engaging with the technical bureaucracy of urban regeneration − the form-filling, call centres, spreadsheets, lack of email response − leaves residents feeling powerless, angry, and upset at the injustice of not being able to access or explain information. I do not highlight this emotive response in search of pity; rather, emotions point to the ways that the technical can influence the ways I and others think and act. Therefore, illustrations overlaid with personal observations aim to communicate an intrapersonal register that is typically excluded from analyses of database technologies.

My use of illustrative figures also draw from the work of Annemarie Mol (2002), who interweaves ethnographic description with analyses of literature using a split-page technique. With a nod to Mol, large-format inserts (henceforth, fold-outs) translate the infinite length of the computer screen into the paper form of this thesis or maintain their length in its digital form. Like the other illustrations,

these fold-outs intentionally inhabit an ambiguous space between art, activist tool, and academic research aid − they are the outcome of engaging, thinking, and working with Lambeth's database systems while simultaneously documenting the process. Like my practice, the fold-outs should be considered speculative, incomplete, and ongoing because I continue to work with them as research and activist tools beyond the limits of this thesis. As such, their content should not always be taken as binary *true or false* statements because my comprehension of the events and objects they describe evolve as time goes on.

Fold-out sheets and other figures signal the spirit of my argument that has proved difficult to articulate within the confines of an academic style of writing. I was tempted to place these fold-outs in an appendix or direct the reader to my documentation website (www.db-state.co.uk) that works as a sketchbook of my activities (see chapter three). However, by interweaving these figures with the text I break down the hierarchy through which theorising and writing take prominence over acts of designing, making, programming, or activism. This communicates to the reader that I hold these activities in equal measure and highlight the importance of my practice as a means of comprehending and researching many more-than-technical components of Lambeth's housing databases.

Finally, I provide a glossary of practice to bring what may seem to be inconsequential acts of programming, making, or activism to the fore. I also incorporate a combined glossary of theoretical and technical terms to underline the equal importance of both. These glossaries point to different modes of reasoning to comprehend how democratic structures, politicians, contractors, commerce, and the abstract components of the relational model simultaneously act on the homes and lives of Cressingham residents.

Chapter 1.
Living with the regeneration machine

Introduction

Figure 1. *Photographs, taken in 2015, of my home, pregnant partner, son, and myself. Images: Henrietta Williams.*

I live with my partner and two young children on Cressingham Gardens Estate (henceforth, Cressingham) in the London Borough of Lambeth, South West London. Cressingham was designed by Lambeth Council's (henceforth, Lambeth) then borough architect Ted Hollamby in the 1960s, built in the 1970s, and described by a past president of RIBA (Dreams, 2014b) as one of the nicest small schemes in England. Cressingham is a low rise, high-density council housing estate that consists of 306 homes roughly divided (as of 2014) into 210 council tenants, 90 homeowners, and 6 properties that have been left empty in a state of disrepair since 1999 (English Heritage, 2014, p.108). The vast majority of residents report that they enjoy living on Cressingham which is located on the border of Brockwell Park, a large park set within a hilly landscape that commands views of the Central London skyline. Cressingham also has a low crime rate in comparison to surrounding areas (Social Life, 2014, p.5).

In 2006, I purchased my leasehold home on Cressingham from a couple who, as secure council tenants, had bought it from Lambeth as part of Margaret Thatcher's controversial Right-To-Buy scheme. The governments transfer of public housing into private hands has seen the number of Britons who live in council-owned homes reduced from around 35% in 1979 to under 8% today (Adam et al., 2015, p.8). Added to this, both Conservative and Labour government legislation, poor maintenance, a failure to build, restrictions on council borrowing, policies of urban regeneration, and a lack of investment, all threaten the ongoing existence of council estates like Cressingham and the communities that live in them.

In 2012, under the banner of the UK's first *Co-Operative Council*, officers from Lambeth's housing and regeneration departments (henceforth officers) instigated a consultation to address widespread

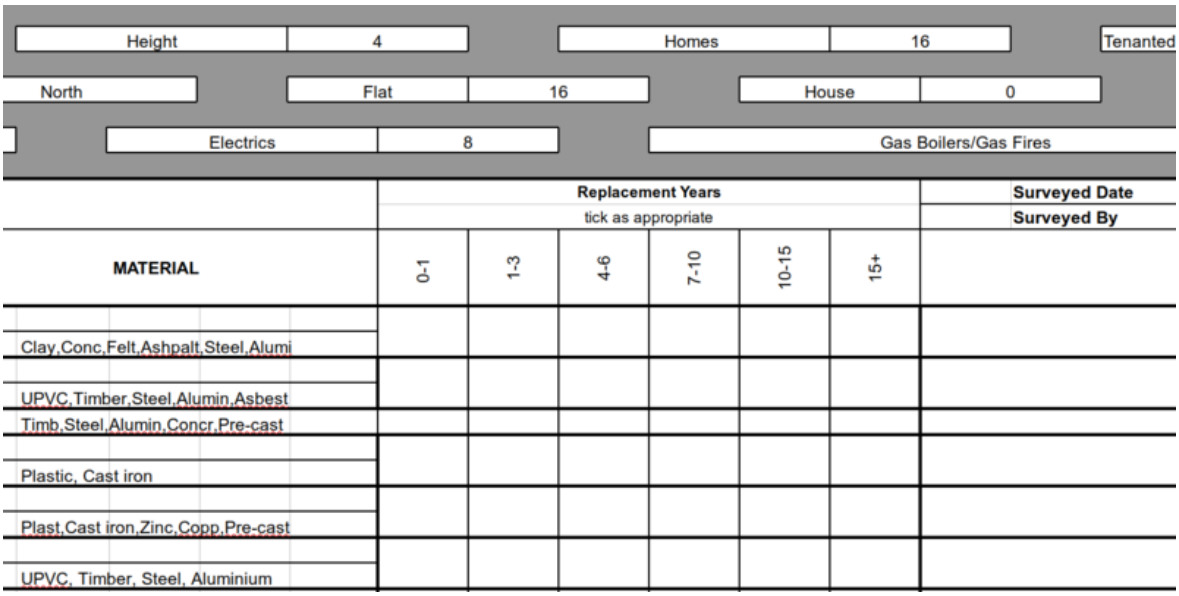
repairs issues in Cressingham (Reed, 2001). The consultation promised residents "a unique opportunity to decide the future of their estate" (Lambeth Borough Council, 2012). Officers informed the Cressingham Tenants and Residents Association (henceforth, *Residents Association*) that they had included the estate in a borough-wide urban regeneration programme. Residents Association committee members were notified that the regeneration department aspired to improve the condition of homes in Lambeth to meet a central government *Decent Homes Standard* (UK Gov, 2006) and an internal *Lambeth Housing Standard* (fig. 3.). However, officers also highlighted that an original provision of £3.4m to refurbish Cressingham fell short of their subsequent £14m estimate (2014, p.5). This shortfall, officers claimed, inspired them to work with residents to help identify a solution.

Figure 2. *View of Cressingham from my back garden gate. Image: Caryl Mann.*

At an early 2012 consultation meeting with residents a council officer stated that "the database told us Cressingham was too expensive to repair" and that the estate had "severe structural issues." This prompted myself and others to scrutinise Cressingham's finances, building surveys, and systems of maintenance and repair. This led to the idea for this practice-based PhD research project that investigates the role of Lambeth's housing databases within processes of urban regeneration. The investigation builds on my work as an artist exploring the social implications of technologies, and involves acts of making, programming, activism, and theoretical research while attempting to prevent the compulsory purchase and demolition of my home.

Throughout Lambeth's consultation, the Residents Association found it increasingly difficult to ob-

tain information from officers. On one occasion, officers promised to immediately supply financial data to committee members. However, it took officers two years to provide this complex financial information in heavily redacted form a few days before a consultation deadline. Likewise, officers took months to provide buildings surveys that, notably, did not record widespread structural issues as officers had claimed. Indeed, Residents Association committee members pushed for an additional survey (Tall Consulting Structural Engineers, 2013, p.7) that noted poor maintenance was the primary cause of deterioration on the estate. These and many other issues eradicated trust in Lambeth's consultation that residents came to regard as a tick-box exercise designed to support a predetermined outcome of demolition.



Height	4		Homes	16	Tenanted
North	Flat	16	House	0	
	Electrics	8	Gas Boilers/Gas Fires		

	Replacement Years tick as appropriate						Surveyed Date / Surveyed By
MATERIAL	0-1	1-3	4-6	7-10	10-15	15+	
Clay,Conc,Felt,Ashpalt,Steel,Alumi							
UPVC,Timber,Steel,Alumin,Asbest							
Timb,Steel,Alumin,Concr,Pre-cast							
Plastic, Cast iron							
Plast,Cast iron,Zinc,Copp,Pre-cast							
UPVC, Timber, Steel, Aluminium							

Figure 3. *Extract from a Lambeth Housing Standard form obtained via FOIA request. Officers use these and other forms to collect data on people homes that inform estimates for repair.*

Cressingham residents frequently complain to the Residents Association about the poor quality of Lambeth's maintenance service. My own experience substantiates this claim. For example, in December 2013 a storm caused damage to the zinc roof of my terraced house which I reported to the council repairs department. The department failed to repair the roof which meant that a subsequent storm in early 2014 caused further damage. Specifically, the storm caused a six-foot section of zinc to violently flap in the wind and threatened to pull the entire roof off. I sought emergency help from Lambeth's repairs call centre, who stated that they could not authorise an emergency repair because "roofs are not priority jobs" and that a contractor would attend in a few weeks. Lambeth's response prompted me to call the fire brigade who were helping to secure three other roofs on Cressingham − that had been similarly damaged by wind − and were shocked that the council had not sent representatives down to the estate. The second storm occurred on the day my partner was due to give birth so the call centre's inflexibility was a cause of immense distress. More than eight years later, Lambeth has still not finished repairing my roof after hundreds of emails, countless telephone calls, numerous *Job ID* numbers, an ongoing legal case, and the birth of our second child.

My experience is not unique as residents across the borough report similar issues with Lambeth's repairs service. The architect Kate Mackintosh (Jessel, 2018; Buzz, 2018) describes Lambeth's renovation of Mackintosh Court, for instance, as an illegal abuse and mutilation of a listed building that has endangered the health of its elderly residents. This powerful language echoes my use of HARMS (described in the glossary of terms and the following section) to articulate the visceral experience of dealing with Lambeth's maintenance and repairs services and point to systemic issues within Lambeth's housing department. For residents, these issues can feel insurmountable because of bureaucratic and political structures that work against residents aspirations for well-maintained homes. Lambeth's system of reporting repairs, for example, can exhaust residents into submission and Cressingham's Labour Party Ward Councillors are driven to uphold a cabinet-defined party line of demolition rather than represent the majority of residents' wishes.[1]

Figure 4. *Activist sign on Cressingham "Friends and Neighbours Abandoned by Labour."*

Notions of left and right wing politics hold little meaning within processes of urban regeneration. For instance, Cressingham's Labour Party ward councillors and Member of Parliament (MP) actively promote demolition based on what residents argue is flawed data. Yet, resident-led analysis and data sources are typically ignored or dismissed. This lack of Labour Party support came as a shock (see fig. 4.) to the predominantly Labour supporting residents (in terms of ward votes) who subsequently obtained substantial support from Green and Liberal Democrat Councillors. Even Conservative councillors in Lambeth and beyond, who are typically seen as enemies of council housing, have been widely supportive of Cressingham.

The housing campaign group *Architects for Social Housing* (2017) identified almost 200 estates in

1 Notably, Councillor Rachael Hayward in Lambeth was suspended from the local Labour party after expressing support for residents in their fight against regeneration and supporting a campaign against library closures. Lambeth Labour hold a large political majority in Lambeth which operates under a cabinet-leader style of governance that exerts tight control over how decisions are made and voted on.

London within Labour-run boroughs that are under threat of demolition or that have already been destroyed. In contrast, they highlighted that only thirty-seven estates in Conservative and five in Liberal Democrat run boroughs were under threat. These numbers indicate that estate regeneration is predominantly a Labour project. However, an understanding of these issues, requires more nuance as they are not simply a problem of Labour Party politics. Rather, a politics of urban regeneration emerges from the ways that knowledge is produced of estates such as Cressingham and then acted on by government at local, city, and national levels. Crucially, this politics is energised by a multiplicity of technological, human, legislative, economic, and democratic concerns. This political situation, therefore, is not easily explained as a product of ideology, rather, it invites political analysis that incorporates a technical understanding of how information and data about Cressingham comes into being.

The Save Cressingham activist campaign (henceforth @SaveCressingham), and my involvement with it, emerged from residents' struggles with Lambeth's consultation and systems of repair. A quantity surveyor undertook a voluntary survey of Cressingham on behalf of @SaveCressingham and estimated that the refurbishment of the estate should cost around £7m rather than the £14m quoted by Lambeth (2014, p.5). Presented with this new information, officers instantly reduced their estimate to £9.4m (Lambeth Borough Council, 2016a, p.9). This reduction led activists to believe that either the underlying data was misleading or officers had nefariously manipulated the figures. Adding to these financial irregularities, a judge (Bokrosova v London Borough of Lambeth, 2015, p.23) stated that she "felt uneasy" about the financial evidence presented in the first of two judicial reviews initiated by @SaveCressingham. This sentiment was shared by activists who had argued in the high court that funds were available for refurbishment and that Lambeth had failed to prove otherwise.

In 2014, a Lambeth Labour Party (2014) pledge to build 1,000 council homes by 2019 shifted the focus of the Cressingham consultation away from refurbishment. This shift led officers to develop five options for Cressingham within a series of design, finance, and refurbishment workshops with residents (see fig. 5.). The options ranged from (one) refurbishment to (two-three) partial demolition/development, and (five) complete demolition and rebuild. In 2015, Lambeth decided to remove options one to four from the consultation and go ahead with option five. This prompted widespread protest by residents (see fig. 6.). A subsequent judicial review, instigated by @SaveCressingham, deemed Lambeth's mid-consultation removal of options to be unlawful (Bokrosova v London Borough of Lambeth, 2015, p.23). However, while the judgement required officers to re-run the consultation, Lambeth decided, yet again, to go forward with option five. As the second @SaveCressingham judicial review (Plant v London Borough of Lambeth, 2016) failed to overturn Lambeth's plans for regeneration, Cressingham's residents are still under threat of displacement and buildings face demolition.

Figure 5. *A Lambeth consultation workshop run by architect Roland Karthaus. The workshop aimed to develop options for Cressingham's future with residents. Image: Karthaus Design*

@SaveCressingham activists identified many areas of concern within Lambeth's proposals for the regeneration of Cressingham. First, at the time of writing Lambeth still aspires to build 464 homes in place of Cressingham's 306. However, of the additional 158 homes only twenty-seven are intended for council rent, with the rest targeted for private rent or sale. Second, Lambeth made an unfair comparison between refurbishment (with infill development) and demolition, as officers expect refurbishment/infill to provide a return on investment after thirty years yet demolition/rebuild has a sixty-year payback period. Third, officers provided heavily redacted financial information to residents citing reasons of commercial interest, making if difficult for residents to properly investigate the financial viability of proposals. Fourth, some council tenants face a 25% post-regeneration increase in rents. Fifth, some new-build properties are set to cost almost 50% more − as discussed in chapter six − than current property valuations, which can force homeowners into expensive shared ownership options, as per Lambeth's (2017b) *Key Guarantees*. Finally, all private tenants are set to be evicted, contradicting a frequent refrain by Councillors that all residents have the choice to remain on the estate.

This thesis introduces a fraction of my engagement with Lambeth's proposals and the individuals I have worked with. The following list aims to communicate a world of urban regeneration and activism that myself and other Cressingham residents have inhabited since 2012: over 300 Freedom of Information Act (FOI) requests; a citizen-led audit (The Peoples Audit, 2017) of Lambeth's

finances; a resident-led survey that indicated 86% of residents wanted refurbishment; deputations to Lambeth's cabinet members at meetings; meetings with the deputy mayor of London; development of The People's Plan (Cressingham Residents, 2016) as a resident-led alternative to demolition; three judicial reviews instigated by @saveCressingham − the first won, second lost, third cancelled by Lambeth rather than go to court; an application to English Heritage (2014) to give Cressingham listed status; a resident-led £9m estimate for refurbishment vs £110m for demolition; a Lambeth-owned £1.6+ billion (2019, p.15) private development company called Homes For Lambeth; a resident take-over of repairs through a legislative Right-To-Manage; Setup of Cressingham Gardens Resident Management CIC to manage repairs; a successful application to central government to explore the Right to Transfer ownership into community hands that could halt Lambeth's plans altogether.

Figure 6. *March from Cressingham to Lambeth Town Hall in October 2015. Image: Louis Leeson*

Lambeth's juggernaut of urban regeneration rides roughshod over personal and collective aspirations for people's homes and lives. Some housing activists and scholars describe these processes as a violent act of displacement, or more succinctly, social cleansing (e.g., Elliott-Cooper, Hubbard and Lees (2019);Radical Housing Network (2013);Architects for Social Housing (2017a);Watt (2018)). The databases Lambeth use, such as their primary housing database *Northgate* (see fig. 8.), produce knowledge of their housing stock. As such, these databases are key components of urban regeneration that operate as *relational machines* (a term I expand on in chapter two) amongst almost 300 associated technologies (see fig. 7.) and practices that constitute the *live process* of Lambeth's administration. This research sets out to comprehend and influence these relational machines while articulating their technological, democratic, and intrapersonal complexities.

BUREAUCRACY MACHINES: LAMBETH COUNCIL

iLambeth Intranet, PCounter, SCCM, VMWare vSphere, Xen Server, Active Directory, Business Objects XI.i (Northgate Housing Universe), C-Series, Election System (Xpress), Email (don't use on Structure Diagram - use Services CIs), Exchange 2010, Framework, Framework Admin Tool, ImerjaMail, LANDesk, Microsoft .NET Framework, Networker, Northgate Housing, Oneserve, Parking Kiosk, PassMe, SCCM 2012, SharePoint, Telephony - Call Pilot, Telephony - CCM6, Telephony - TM3 (Phone Management), Uniform, Academy, Anite Public Access, CASPAR, Contender, DRS, Framework - Business Objects, Framework - Business Objects (InfoView & Web Intelligence), ICPS Suite, Oracle Enterprise Manager, Oracle RMAN Backup Repository, Public Access -Planning, Query Builder, Visual Files, Zengrab, AIM (Axis Income Management), Cyborg HR, Northgate HAF, Northgate Self Serve Housing Application Form, Oracle Applications Express, Talis, Talis Income Manager, Gandlake, GCSx Outlook Web Access, Genero Desktop Client, Oracle - E-Business, Oracle - HR, Oracle Applications: Accounts Payable, Oracle Applications: Accounts Receivable, Oracle Applications: Cash Management, Oracle Applications: General Ledger, Oracle Applications: PO / iProcurement, PuTTY, Trend Micro Enterprise Protection (Anti Virus), AddressMatch, Address-Point, ADManager Plus, Alto Web Services, ArcGIS (Web GI software), ArcSDE (Server GI software) (supporting web and desktop GI; spatial data for Symology, Public Access, Artifax Artemis - eBookings, ArtifaxEvent - PDC (Prof Dev Centre), ArtifaxEvent - Registrars, ArtifaxEventOnline (PDC), Asylum Seekers Live, AUTOCAD - Infrastructure Design Suite, AUTOCAD- Building Design Suite, Bacas, Bibliotheca Smart gate Manager, Bibliotheca SmartServe Kiosk, Bibliotheca SmartTunnel Manager, Cashier Kiosks, dataMAP, Directory Equiries - Intranet, Education Management Information Systems, E-forms, Egress, EPIC, Fast Entry, FTPs, Geocortex, Hummingbird, iCasework, iCasework Members Enquiry, IMPULSE, InCase Intelligence, Issue Manager, iStorm, JTB Flex Report, Keystone Asset Management System, LAS Console, Leaving Care, Logotech Fixed Assets Register, London Grid for Learning, Marcomm Newsflash, MatchCode, Microsoft Visual SourceSafe, Modern.Gov, Natwest Bankline, Netloan PC Booking, Oracle Applications: Application Desktop Integrator, Oracle Applications: Discoverer, Oracle Applications: Financial Statement Generator, Oracle Applications: Learning Management, Oracle Applications: Oracle Financial Analyser, Oracle User Productivity Kit (UPK), Paye.net (PAYE Portal) and ACR, PDF Creator (Intranet), Q-Flow, RAFTS, Respond, RSS -, SAS, School Data Loader, Sky, SMART for dataMAP, SPOCC, SPOCCnet, Strand (Electoral Register), Symology Insight, Synergy, Talis Assure (offline module), Talis Bridge, Talis -Prism 2, Talis Prism 3, Total Land Charges, Verifone (Chip 'n' pin), Websense filtering system (Libraries), Youth Offender Information System, ArcMap, Aspireview, AutoCad Vehicle Tracking, Bibliotheca RF4 returns kiosk, Bibliotheca Tag Apply & Smartwedge, Cute PDF Converter, Deepfreeze, Electoral Register Lookup, Food Surveilance System, GIFTS, GPCC (Locks down machine group policies), JCAD Audit Tracker, JCAD Lachs Insurance, JCAD Risk Web 3.1, KeyAccident, Keyline, Keysign, Landmark (standalone systems), Landmark (web system), Launcher (launches LLIAS products), Locker (additional password access to PCs for local administrators), LTA Toolkit, MasterTrader, MultiVue, Oracle I Supplier Portal, RSU - school reporting online, Sage ACT!, SENATE, SNAP - survey forms, Tableau, Talis Decisions, Talis Soprano, TEDDS_12, Trucrypt, Webspy (internet monitoring), 1APP, Acrobat 8 Pro, Additional datasets, Adobe Acrobat Distiller, Airwatch Mobile Data Management, Claro Read Pro, ClaroView, ControlPoint, D.cal, Dolphin Supernova / Lunar + (Special needs software – includes screen reader), Dragon, E-Casework, epass, Ezytreev, Financial Investigation Toolkit, Firefox, Fireworks, Fisher Family Trust, Fitbug Bug Manager, Flash, Flash Player, Framework (Report Repository), Google Chrome (PC), Google Earth, Home to school Transport Database, Hotspot Dectective, iChIS, ID Pro, IDOX - Public Access, Illustrator, InControl Intelligence, InSearch Intelligence, Inspiration, Keypass, Lambeth Contracts Register, Learning Pool Authoring Tool Vers 5.3.0.0, LifeSPAN IS, LLIAS (booking, client and kiosk), Lumension Port Security, MAC OSX 10.5.1 - Leopard, MapInfo, Metacompliiance, Microsoft Access, Microsoft Excel, Microsoft Excel Converter, Microsoft Office 8 for MAC, Microsoft Outlook, Microsoft Project 2013, Microsoft Visio 2013, Microsoft Word, Mindjet, Mobile phone software i.e Nokia PS suite, Mozilla Firefox (PC), ODEX, Olympus Administrators Tool, Olympus Dictation Tool, Olympus Sonority, Omnidata, Parallels Desktop for MAC (Virtual PC), PC Memo Scriber 4 (Dictaphone), PDF-Xchange 3, Pensions, Photoshop elements, Planning Perfomance Reports, Plantime, Pupil achievement Tracker, QuarkXpress v7 (MAC), Quickbooks, QuickTag, Quicktime Player, Read and Write Gold, Reading Assistant v4.1 (Rapid Programme), S106, Safari 4.0 (530.17), School governor database, Schools Data Loader, SharePoint Online, SIMS (Schools Information Management System, Smart Board software, Spark Space, SPRUNT(Firewall access only), SPSS, TEAM Energy Accounting, Technology Forge Facility, Telephony - e-Operator, Telephony - NICE (Voice Analytics), Telephony - NICE (Voice Recording), Telephony - NU Technology, TOAD, TRAVL, TVCO, Tweetdeck, Uniform Enterprise, Universal Ma-nagement Information System, Video Anywhere (Trigman Security), VRR, Windows Movie Maker, Winscribe, WinZip 8.1, Zoomtext.

HTTPS://WWW.WHATDOTHEYKNOW.COM/REQUEST/ERP_SYSTEMS_174

Figure 7: Fold-out: List of almost 300 technologies used within Lambeth. Many of these interconnect and are used across all of Lambeth's services and departments. The information is primarily derived from personal notes and one FOIA request (Paramo, 2016).

Artist and activist-led research

Database technologies are implicated in the demolition of homes and the displacement of communities. This doctoral project employs practice-led and theoretical research to investigate the role of Lambeth's database technologies within processes of urban regeneration (see fig. 8.). In the UK, affordability and access to housing is a pressing social issue, yet government proposals to address these problems through private and local authority led urban regeneration schemes have proven highly controversial. Notably, the deadly 2017 Grenfell Tower fire brought the democratic and deliberative practices of central and local government into sharp focus, as have long-running housing campaigns fighting the demolition of council-owned housing such as the Aylesbury, Central Hill, and Cressingham housing estates in London. Central to local authority regeneration projects are databases with a multiplicity of associated technologies and practices that organise and undertake the repair, maintenance, and demolition of housing stock. However, while Lambeth (2012) recognise their databases as critical components of their administration, for residents and the public alike, they remain unacknowledged, poorly understood, and largely invisible. It took four years of inquiry, for example, to obtain this single screen-shot (see fig. 8.) of Lambeth's graphical user interface (GUI) for their Northgate housing database system.

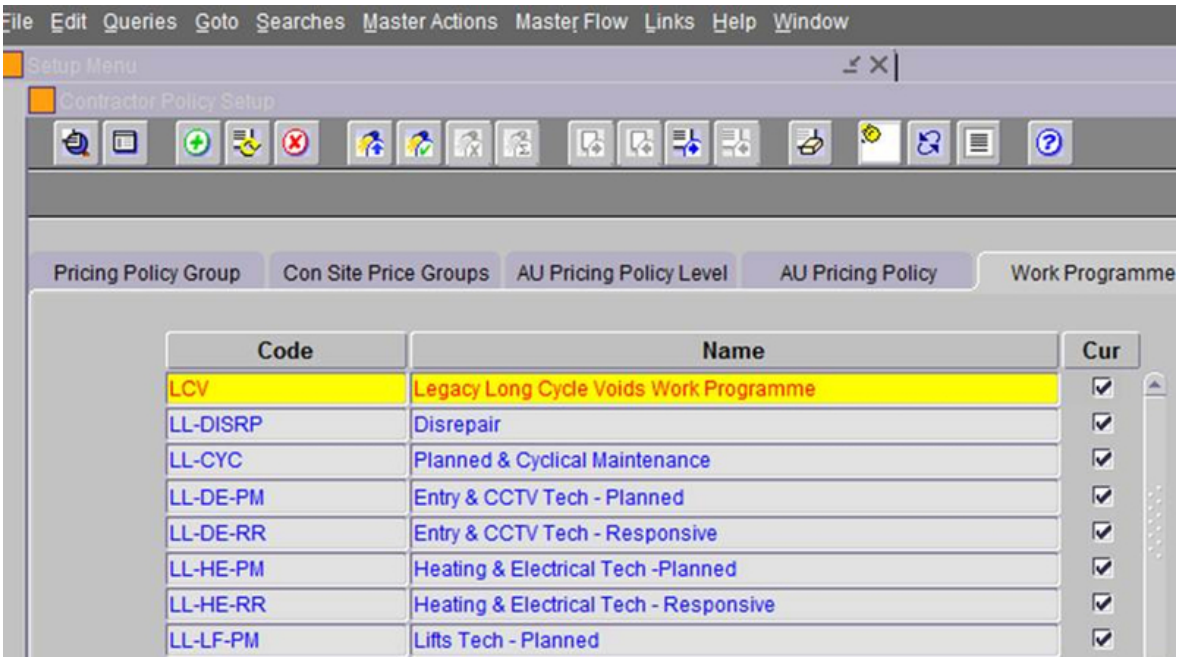


Figure 8. *Screenshot of Lambeth's primary housing database called* Northgate.

Lambeth's database systems are impossible to describe in their entirety. This is because databases have many hidden components as well as inputs and outputs, are constantly changing, and can be understood through multiple registers and scales. For instance, through a democratic register, Lambeth's database systems and practices are recognisable in the proceedings and documents of Cressingham's Residents Association, Lambeth Cabinet, London Assembly, and national parliament − they influence and mediate the decisions of appointed representatives within these multiple

versions of democratic process. An economic register connects the financialisation of UK local authority housing with flows of global capital as elucidated by the book *Big Capital*, written by the journalist and urban studies scholar Anna Minton (2017). An ethical register considers how monetary calculations of urban regeneration exclude mental health, environmental, and other such concerns. A technical register can elucidate how database technologies control access to information through chains of network infrastructure, protocol and human operators. Further intrapersonal, historical, and other registers mean that housing databases are infinity complex to fathom.

This personal and political research project has three key starting points. First, I am a homeowner living on Cressingham and resisting its demolition by Lambeth. Second, as an artist, designer, and programmer I make things to understand how technical objects do things in the world. Third, I undertake my research within the Department of Design, Goldsmiths University of London (henceforth Goldsmiths). My research situates me between the multiple worlds of writer, programmer, artist, designer, activist, academic researcher, husband, father, and possibly losing my home. I inhabit and explore these interstitial and intrapersonal spaces through many art, design, activist, and writing practices. In doing so, I address these spaces as valid sites of research and examine how Lambeth's housing database technologies affect how I and others think and act in a world underwritten by computational data management processes.

I collectively refer to the practical, activist, and theoretical work I have undertaken as artist and activist-led research (henceforth, generally abbreviated to research). The overarching methodological approach is informed by a method assemblage (Law, 2004) that incorporates a critical technical practice (CTP) rooted in a critical theory-based approach towards technological design developed by computer scientist-turned-theorist Phil Agre (1997). Agre's approach was further developed within the former Centre for Cultural Studies at Goldsmiths between 2007-2017 which integrated art as a method of enquiry (Harwood, 2019). In addition, this research is informed by action research methods and a European/Scandinavian tradition of participatory design. A detailed description and rationale for the methods employed in this project are presented in chapter three.

Through this project, I instigate research activities and create devices (discussed in chapters four to six) think and act with Lambeth's database technologies. In this work I explore several analytical themes that run throughout this thesis including notions of *acceleration*, *accountability*, *multiplicity*, *ambiguity*, and *labour*. These activities and themes provide opportunity to inhabit spaces between academia, activism, art and family life. One such example, the *Special Purpose Vehicle* (see fig. 9.), is a bicycle trailer that simultaneously helps to: film Cressingham; converse with residents; build a database of repairs; and juggle personal childcare responsibilities. The act of creating the Special Purpose Vehicle, discussed in chapter six, pointed to ethical, material, and technical considerations of Lambeth's database technologies that would have been missed through other means.

The ambiguities associated with arts practice provide a way to engage with Lambeth's databases.

For instance, I borrowed a technique from one of my arts projects (Keene and Kyprianou, 2007) that used an amusing acronym to address hidden and unknowable technical processes. With intentional black humour, the acronym *Housing Asset Repairs Management Systems* (HARMS), which is mentioned in the glossary of technical and theoretical terms, accounts for a multiplicity of association and the unknown − it addresses *anything* associated with Lambeth's database systems. This ambiguity of association is an important because the edges of what constitutes a database system can be difficult to identify, particularly when considered through more than a technical lens. Furthermore, my use of HARMS resonates with Matthew Fuller and Andrew Goffey's book *Evil Media* (2012, p.23) that considers the *evil* within the networks of people, devices, and protocol involved in the communication and production of knowledge.

Figure 9. *The* Special Purpose Vehicle. *Used to film Cressingham, speak with residents, transport and amuse my children while I worked.*

Any future reference to HARMS serves as a reminder that Lambeth's database systems can cause anxiety and distress, remain out of reach and are ultimately unknowable because they are ever-changing, invisible, and ambiguous. Here, I draw from Adrian Mackenzie (2010, p.5) who addresses the complexities and impact of technologies by considering things that cannot easily be codified, symbolised, or quantified. He expands the understanding of what a database is beyond its computer science definition as a technical object that records and organises nodes of data. In this way, HARMS points to things that appear human, machine, social, cultural, political, or technolog-

ical where the distinction between these terms is not always clear.

My use of the term *more-than-technical* throughout this thesis accounts for databases as a process involving multiple human and technical components. These components include database technologies, call operators, repairs staff, network infrastructure, and a multitude of other entities that all mediate the process or reporting and acting on repairs. For this reason, and echoing various views (e.g., Barron, 2003) within social and cultural research, the term more-than-technical resists a strong distinction between what is human and non-human to account for the blurred boundaries of Lambeth's database systems.[2]

The term aspiration has many resonances within this project. Aspiration connects with notions of social mobility, affordable housing, home ownership, and holds associations with a governmental and biopolitical (Foucault, 2008) desire for better homes and a healthier population. Aspiration captures the conflicting interests of councillors, contractors, and Lambeth staff that can be party political, financial, or focused on career development.[3] The term also accounts for residents hopes for their homes and community that are subsumed into the administrative logics of maintenance, repair, and regeneration. Aspiration is a term that extends beyond individual concerns to consider how cultural aspirations for society and the urban environment are formed through and with socio-technical collectives. Aspiration also resonates with abstract ideas of a utopian future achieved through ever more efficient machinery of urban regeneration. The concept of an *aspirational database*, therefore, implies the way in which human aspirations are mediated by database technologies that enact systems of maintenance, repair, and regeneration while shaping what they become. I realise that the concept of an aspirational database might seem strange as it imparts a sentient quality to a technical object. However, the aspirational database should be considered a reminder that databases are intertwined with human endeavours.

Database technologies are bound with issues of social inequality. However, this thesis does not explicitly discuss class, race, or gender. The reason for this exclusion is that the focus of this thesis is on a politics that arises from the technical where I consider class, identity, and technology in cultural rather than theoretical terms. For example, there are clear cultural differences between me as a white male from a middle-class background, and working-class residents of Cressingham from diverse cultural backgrounds. While, at times, I observe how these cultural differences impact

2 Studies of technology have increasingly used the term *more-than-human*, which was coined by the philosopher David Abram (1997), to describe the blurred distinction between human and non-human entities. However, I chose to use the term more-than-technical because it was more easily understood by residents when I discussed my work.

3 It is notable that science and technology (STS) scholars have a tradition of using the term *interests* that stems from Michel Callon (1982; 1986). Interests is comparable to my use of aspiration in that it is employed to think through both collective *social interest* and the individual *interests* of a diverse range of actors. However, I chose to use the term aspiration over interests because it has a stronger association with progress, a desire for change, and abstract ideas.

how Lambeth's repairs and maintenance services deal with residents, a theoretical analysis of these differences would expand the remit of this thesis.

To summarise my research approach, through acts of making, programming, and theorising, I explore the role of database technologies within urban regeneration. Through these activities and work with Cressingham residents I have been able to reveal the malpractices of a local authority and explore what a meaningful democratic process should look like. This has made it clear that issues arising from urban regeneration cannot be reduced to individual issues of economic status, ideology, party-politics, class, or identity. Instead, I argue that regeneration is a multiplicity, a manifold process that demands to be addressed through an understanding of and engagement with technical systems in Lambeth. Thus, I focus on the technical as a site from which inequalities and dynamics of power and knowledge arise.

Databases and democracy

Databases are now everywhere; they influence a vast range of activities in contemporary society, yet they remain largely invisible and inaccessible. Databases organise how we buy things online, engage with social media, or receive and pay for our household services such as water and electricity. When I report a repair to Lambeth, for example, my telephone service provider creates a record of my call on a database somewhere so that they can bill me at a later point in time. Lambeth's automated telephone system (another database system) then acts as the gatekeeper to determine with whom I will speak. More databases invisibly manage and monitor network traffic as I make my call. Lambeth's primary housing database *Northgate* then allows a call operator to create a record of my repair report and share it with various surveyors, contractors, and finance staff. Before I have even reported a repair, multiple database systems are enabling and constructing how I act in the world while they also record and account for mine and others actions.

The relational database is a particular kind of database. Such databases are at the heart of software systems that capture, process, and govern many aspects of our lives on behalf of state agencies, companies and individuals (Kitchin and Dodge, 2011, p.110). Relational databases are ubiquitous, mostly invisible and instigate action at a distance to the things, people, and processes that they represent. As the computer scientist and social scientist Paul Dourish (Dourish, 2014) highlights, databases are an essential part of the technological infrastructure of contemporary everyday life. This infrastructure is bound with the concrete lived experience of Cressingham residents.

Concerning other aspects of daily life, the 2017 British Airways information technology (IT) outage illustrates that when databases stop working the effects can be far-reaching. The disruption stranded 75,000 people when flight data became inaccessible and is believed to have cost the company over £100m (Press Association, 2017). Likewise, databases that underpin the social media platform Facebook are implicated in the results of the UK's European Union referendum in 2016. These ex-

amples demonstrate that databases do more than record and produce data: they have consequences in terms of the distribution of risk, economic impact, and democratic accountability.

The condition of UK housing has triggered state intervention over a long period through successive acts of parliament. UK legislation and policy outline strategies for action on population, land, and buildings. Local authorities such as Lambeth attempt to enact those strategies through databases and processes that record and produce knowledge about tenure, personal identity, land value, and the material condition of homes and environments. This knowledge impacts decisions at multiple levels of the democratic process (see fig. 10.) from Residents Associations, local authority cabinet decisions, the London Assembly, and right up to the UK Parliament. These entanglements of democracy and technology invite questions about the relationship between power, knowledge, and technology addressed by my research.

Faced with the demolition of my home, I realised that I had little understanding of how democracy worked at a local authority level. I now understand that Lambeth follows the leader and cabinet model, through which the leader appoints cabinet members who hold a separate portfolio such as housing, finance, or regeneration. After consultation with residents, council officers submit recommendations for review at cabinet meetings. Ward councillors and members of the public are invited to speak at these meetings, and residents are typically permitted three minutes each to talk. Cabinet members then vote on officer recommendations. Ward councillors can submit cabinet decisions on behalf of residents to Lambeth-appointed scrutiny committees who can refer decisions back for cabinet review. Finally, members of the public can instigate a judicial review that can overturn cabinet decisions. While this participatory democratic process may seem clearly defined, in reality it is a winding path with many influences that are far removed from written council reports and legal judgements. My attempt to diagram (see fig. 10.) these processes points to multiple versions of democratic participation that operate outside of typically understood hierarchical structures. For example, adhoc conversations, party-political agenda, individual council officers, misunderstanding, and error can all impact how public consultations actually play out.

Residents require a vast array of expertise, knowledge, commitment, and perseverance to engage with or intervene in processes of urban regeneration. To effectively scrutinise information, residents must understand buildings, architecture, planning, data, technical systems, law, finance, housing management, tenancies, home ownership, and more. Contesting plans for regeneration requires knowledge about legislation and the ways that decisions are undertaken and enacted within different layers of government. Residents must also determine how national and local government produces knowledge about people's homes through a multiplicity of technical systems. Crucially, the machinery of party-politics, financial markets, national legislation, and local policy can infuse technical systems with conflicting aspirations for the future of Cressingham.

VERSIONS OF PARTICIPATION

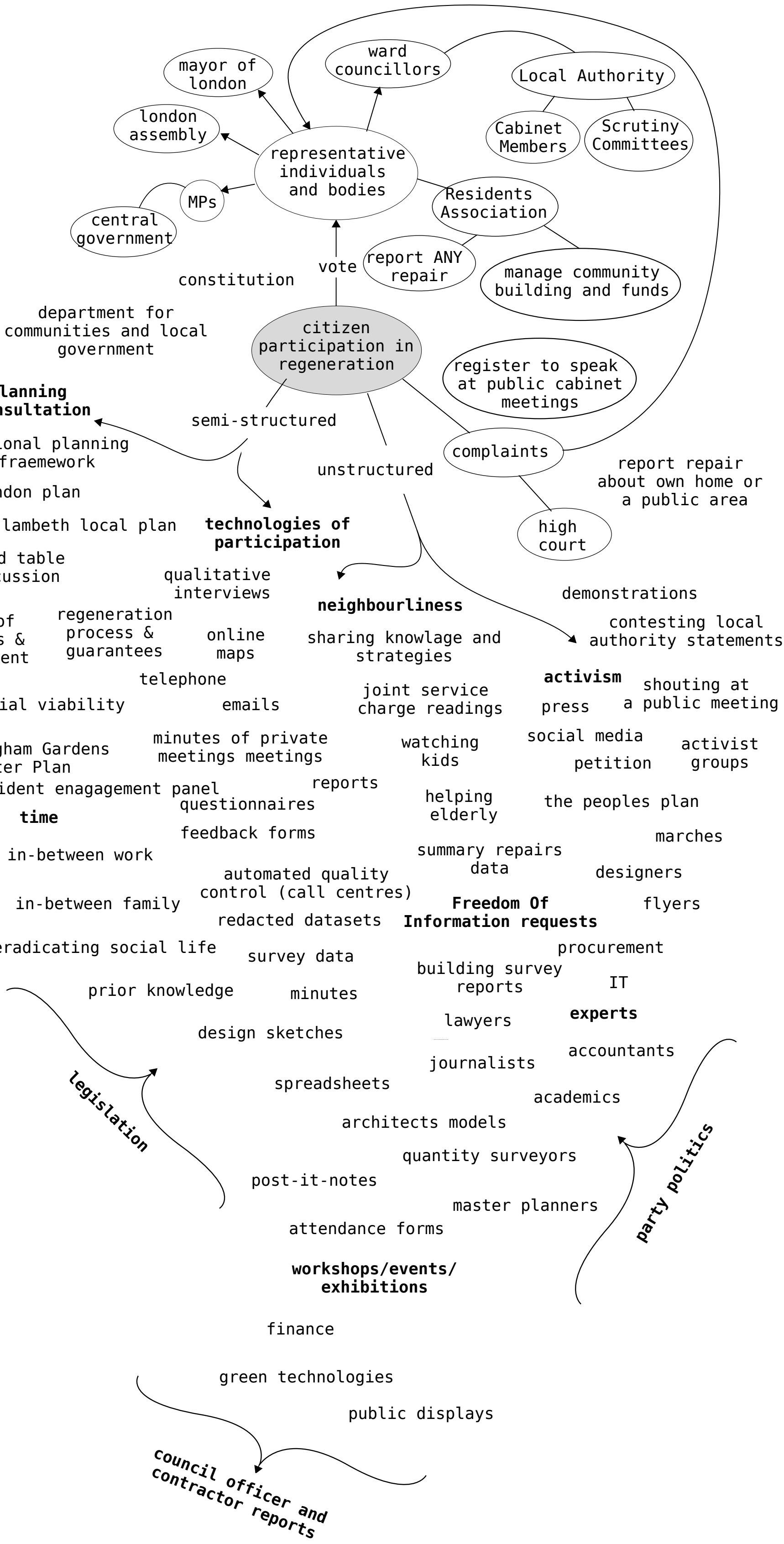


Figure 10: *Fold-out: Versions of democratic participation, including technological entanglements.*

The relational model and regeneration

Lambeth work with several databases in the management of their housing stock. Through reporting repairs to my home, I encountered the *SX3* database, later renamed *Northgate Housing* which Lambeth identify as their primary housing database. My attempts to audit repairs data revealed an *Oracle E-Business* finance database and an *Oracle Cloud* system that Lambeth introduced around 2018. FOIA requests (e.g., Lambeth Borough Council, 2013) identified asset management database's called *Lifespan* and *Keystone* that record survey data. These databases interlink via network protocol and infrastructure. They are most likely hosted on Microsoft server equipment managed by Lambeth's IT department and more recently on cloud-based hosting. The structure of data within leaseholder service charge statements (see fig. 69.) indicates that Lambeth primarily work with relational database systems that are a particular type of database as mentioned above.

E.F Codd (1970), is considered to have produced the first formal and technical definition of the relational database known as the *relational model*. In a landmark paper, Codd stated that "future users of large data banks must be protected from having to know how the data is organised in the machine" (1970, p.1). Donald Jardine (1977, p.3) evolved the *relational model* into an abstract design standard for a Database Management System (DBMS) known as the ANSI/SPARC DBMS. ANSI/SPARC never became a formal standard even though its approach to data independence was widely adopted (Patel, 2016).

The relational model incorporates a three-level architecture that separates how a database physically stores data (the *Internal* layer), from its logical structure (the *Conceptual* layer), and how humans or machines can view that data (the *External* layer). These layers of separation are recognised (IBM, 2003) to have radically reconfigured how and where people can work with data. In Lambeth, these layers mean that individuals working within finance, housing, regeneration departments, and contracted organisations can view the same dataset from any location with a network connection.

A database schema describes how a relational database structures its data. The schema defines tables, columns of data, and the data-type that any column must contain. *Data-types* include integers (whole number), floating points (number with a decimal point), boolean value (true or false), and text strings (freeform text). The schema also defines *primary-keys* that provide a unique reference for each row of data in a *table*. A schema exerts formal control over data entry to ensure that Structured Query Language (SQL) can operate on a dataset in repetitive and predictable ways (Jardine, 1977, p.p156).

Structured Query Language (SQL) was developed by IBM (1996) in the 1970s and became the international standard for communicating with relational databases (American National Standards Institute, 1986).SQL is code that allows a programmer to create, retrieve, update, and delete data from a relational database. SQL was closer to human language than other programming languages

such as LISP, FORTRAN, or C and radically reconfigured the work of databasing. The invention of SQL reduced custom written multi-page computer programs to one-line SQL queries (see fig. 11.) that required less expertise and time to write. SQL provides multiple views of filtered and sorted data, and in doing so governs who can access and see aspects of a dataset.

These computer science definitions of a relational database may seem far removed from the experience of residents living on a council estate. Indeed, technical literature explains the relational database as an abstract concept that dictates how data-entities are organised within computer hardware. However, relational databases are key to an understanding of regeneration on Cressingham because they organise how Lambeth understands and acts on its buildings and residents. Databases, therefore, are implicated in local government politics, decision-making, and issues of maintenance and repair. A boolean *completed* field, for example, enables contractors to overcharge Lambeth for work by identifying jobs as complete when, as I discuss in chapter five, they have not been completed at all.

```
------- SCHEMA -----------
TABLE `properties` (
  `property_id` INTEGER (primary_key),
  `estate_id`  TEXT,
  `beds`    INTEGER,
);
TABLE `estates` (
  `estate_id`  INTEGER (primary_key),
  `name`    INTEGER,
);
------- SQL QUERY --------
SELECT sum(beds) FROM properties WHERE estate_id='EA037';
------- RESULT -----------
560
```

Figure 11. *Schema for a relational database with a SQL query and result. The schema is derived from the* Shadow Database *discussed in chapter six.*

Many-to-many relationships between fields of data are the defining characteristic of the relational database that drives its adoption in so many areas of life. Before the relational database, hierarchical databases organised data into a tree-like one-to-many structure. This hierarchy is limited because a data entry can only exist within one category at a time − as with the folder structure on a modern computer operating system. In comparison, many-to-many relationships allow any row of data to be associated with any another row or rows. Primary keys, therefore, carry potential to

multiple associations between fields of data, other databases, and the objects, people, practices, and environments that the data represents − all of which is socially and technically difficult to fathom.

The relational database distributes and accelerates the ways that people can work with data. With previous database technologies, a single team of engineers worked on a single computer to extract meaningful information. In contrast, the distributed architecture of the relational model allows multiple humans and machines to simultaneously access and organise data. The snippet of code in figure 12., for example, connects to a database stored on another computer (host) via the unique Internet Protocol (IP) address *109.237.26.21*. These kinds of connections allow for complex material arrangements of humans and machines that produce residents' experience of repairs and maintenance on Cressingham.

The layers of separation in the relational model mean that Lambeth can update hardware, network configuration, interface, data, and data structures without disrupting the day-to-day flow of business. These layers allow multiple databases to serve data to a single Graphical User Interface (GUI) distributed across multiple computers. For example, Lambeth's Northgate system displays data from its own database alongside information from separate asset management databases. Crucially, Lambeth can reconfigure and add database systems with little impact on the day to day flow of data and work. This ability of relational database systems to undergo constant change is a key characteristic of the relational model that makes it difficult for activists to navigate or figure. Even housing officers, for example, have a limited understanding of the extent of Lambeth's technical systems because many operations and configurations occur out of sight.

```
import mysql.connector
DBconnection = mysql.connector.connect(
  user="my-username",
  password="my-password",
  host="109.237.26.21",
  database='database-name'
)
```

Figure 12. *Python programming code that connects to a remote relational database.*

In the context of housing management, I argue that the relational model accelerates and configures the marketisation of housing services. Police seized (BBC News, 2017) thirty-one million documents and identified 336 companies of interest in their investigation of the Grenfell fire.[4] It is

4 The Grenfell tower fire is (Architects for Social Housing, 2017b) believed to the result of inferior quality cladding used in a refurbishment. Financial decisions took precedence over residents concerns that warned of a fire risk three years prior to the tragedy (Grenfell Action Group, 2017).

impossible to imagine how this complexity could have emerged without database systems of some kind. In his analysis of regeneration and Grenfell, the urban geographer Stuart Hodkinson (2019, p.29) describes the management of social housing as a world of private profit-seeking cartels that have cut quality and casualised workforces. He describes how histories of housing policy and practices of private investment and housing management led to the horrors of the Grenfell Tower Fire − and in doing so points to systemic issues within UK social housing management. Watt (2019, p.14) provides more detail here with his research of housing inequality in London that he traces back to a four decade-long pursuance of neoliberal housing policies. Both Hodkinson and Watt provide important pointers to finance, legislation, party-politics, and ideological considerations of urban regeneration in an analysis of housing databases. On Cressingham, as with Grenfell, this world is characterised by layers of contractors, subcontractors, call-centres, and remote forms of management enabled, mediated and classified by the relational model. It follows therefore, that issues of urban regeneration must also be addressed through a technical lens.

Work that critically and experimentally explores the cultural and societal implications of software engages and contributes to the research and work of computer scientists, designers, artists, engineers, cultural theorists, programmers and others. Broadly speaking, the terms *software studies*, *media theory*, *media archaeology*, and *critical making* provide jumping-off points from which to explore debates that draw from domains of computer science, philosophy, media studies, cultural studies, science and technology studies (STS), the arts, and design. These debates emerge with ideas, for example, that: technology is a practice with political and cultural consequences (Franklin, 1990; Star, 1995); the origins of digital technologies are found far in our past (Standage, 1998; Marvin, 1990; Parikka, 2012); technical devices and data work to shape our cities and environments (Shepard, 2011; Mattern, 2017; Kitchin and Dodge, 2011); technologies actively constitute the world and ourselves (McLuhan, 1994; Kittler, 1999); software should be understood as an object of study that gives rise to cultural and political formations (Fuller, 2008, p.2); digital technologies cause imbalances in our lives that contribute to feelings of a loss of autonomy (Kitchin and Fraser, 2020, p.43). Software has a materiality behind screens and visualisations within its electrons and logics of computer hardware and networks (Petzold, 2000; Galloway and Thacker, 2007; Mackenzie, 2010); and understanding the role of software and digital technology in our lives requires a critical approach to making-with technical objects (Bogers and Chiappini, 2019; Colakides, Garrett and Gloerich, 2019).

The cultural and technical literacy of these debates brings sharp focus to the relational model as part of the machinery of urban regeneration within more-than-technical endeavours to collect information and reconfigure buildings and lives. As an artist, activist, and researcher living with these machines, these domains of scholarship help observe how they perform their work as residents attempt to resist and intervene in their operation.

Chapter 2.
From technical object to aspirational database

Introduction

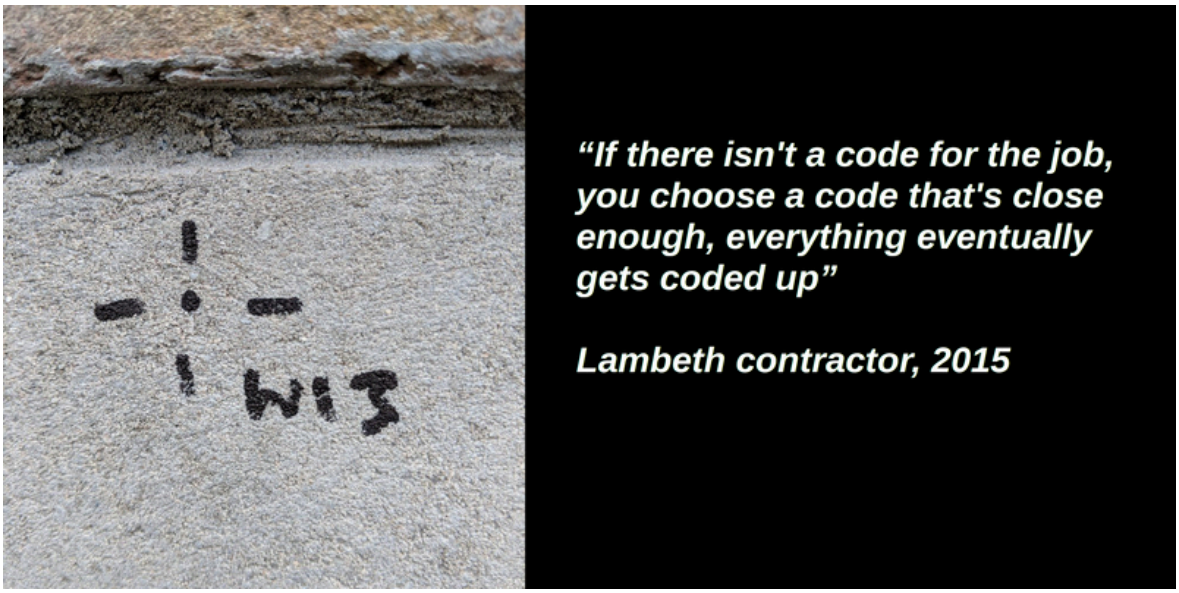


Figure 13. *Surveyors marks that started to appear on Cressingham during 2018. The associated quote is from a contractor talking about Lambeth's* Northgate *database.*

This chapter develops the concept of the *aspirational database* to investigate different technological, material, political, historical, ethical, and intrapersonal registers of Lambeth's database technologies. I first address Cressingham as an important example of urbanism and activism within the field of urban studies. I then argue that Lambeth's databases are a site of individual, institutional, governmental, political, and economic aspirations to organise urban space and its inhabitants. I explore how these databases focus on the optimisation of process and in doing so produce continually changing sets of associations. For example, while Lambeth's housing database systems might once have shaped aspirations to repair Cressingham those same systems now orientate a desire to demolish homes and displace communities. As Lauren Berlant (2011, p.43) observes in *Cruel Optimism*, aspirations can never be fulfilled and can be tainted.

Aspiration is a pivotal term in this project that connects three key concepts to my analysis of Lambeth's housing databases. First, Harwood's (2013) concept of the *relational machine* articulates database systems as the collective endeavour of humans and machines to amass information within systematised processes. I argue that within this endeavour human aspirations for urban development are shaped by the affordances of database technologies. Second, Foucault's (1980, 1995) concept of *power/knowledge* provides tools to describe how institutional truths about Cressingham, such as the condition of buildings, emerge with database machinery and a culture of management, party-politics, maintenance and repair in Lambeth − and also within external layers of contractors, sub-contractors, surveyors, architects, and consultants − that drive council aspirations for demolition. Third, the French philosopher Gilbert Simondon's (1958) theory of individuation ascribes political agency to technical objects that shape conflicting aspirations for the maintenance, demoli-

tion, and optimisation of housing services on Cressingham.

It is important to highlight that the theorists I draw from in this thesis do not employ the term aspiration as a specific conceptual term though they do mention it in passing. For example, Simondon (2016, p.132) identifies a *cultural aspiration* for the transformation of social structures through the advent of eighteenth-century machines that focused on force, speed, and precision of gesture. Furthermore, in their analysis of Simondon's work both John Hart (1980, p.2) and Murial Coombes (1999, p.35) identify his alignment of human aspiration with technology which points to the ways that technical objects shape human ideas. Finally, Foucault's (2002, p.69) description of how knowledge practices take place within a field of interests, and desires invites consideration of human aspiration within the formation of power dynamics. In combination, these theoretical tools provide a radically expanded notion of the relational database comprised of all kinds of human and non-human objects and relations.

Activism, urbanism, and a technical politics

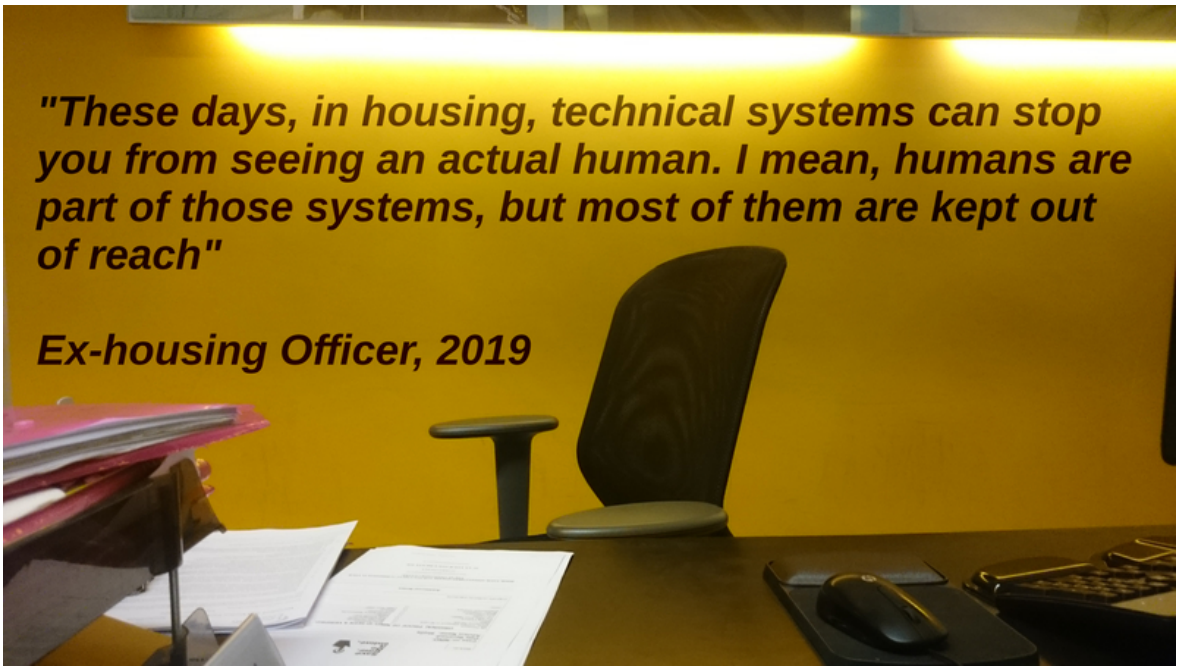


Figure 14. *Image of Lambeth's customer service centre in Brixton. Quote from an ex-housing officer.*

The output of campaign groups such as Architects for Social Housing, Just Space, and Southwark Notes intersect the academic worlds of urban studies and architecture and provide entry points to the terminology and dominant modes of thought within processes of urban regeneration undertaken by authorities like Lambeth.[1] Indeed, as urban studies scholars Paul Watt and Anna Minton (2016,

1 Website addresses for the activist and academic groups I mention that include: www.35percent.org, https://southwarknotes.wordpress.com, www.architectsforsocialhousing.wordpress.com, www.justspace.org.uk, www.ourcity.london.

p.205) highlight, it is activists rather than academics or housing organisations who have brought this housing crisis to public prominence, so their expertise should be recognised. To this end, Watt and Minton organised a conference that resulted in a special issue of the *City* journal titled *London's Housing Crisis and its Activisms* (Watt and Minton, 2016) with papers devised or written by residents affected by regeneration alongside academic texts. One paper, written by Cressingham residents and activists Pamela Douglas (a solicitor) and Joanne Parks (a journalist) provides nuanced details about Lambeth's consultation over Cressingham to articulate the complexities faced by residents. However, texts such as these exclude a technological analysis of urban regeneration to focus on the lived experience of regeneration, class, housing policy, finance, or other vectors. Thus, in this section, I make the connection between activism, urbanism, and technology.

Cressingham is a prominent, widely cited, and important example of urban regeneration and activism (e.g., Beswick and Penny, 2018; Minton, Pace and Williams, 2016; Penny, 2017; Boughton, 2019; Sendra and Fitzpatrick, 2020; Watson, 2020). This attention is largely the product of the @SaveCresingham campaign which has been described as one of the most energetic estate-based housing campaigns in London (2017, p.122). @SaveCressingham has brought the plight of those living in social housing to London-wide (London Assembly, 2015), national (Marrs, 2018; Sng, 2017) and international (Arch+, 2018) attention, as have other notable housing campaigns such as the Focus E15 mums and those associated with the Heygate, Aylesbury, and Robin Hood Gardens social housing estates in London. Crucially, activists within these campaigns report a similar experience of repairs, local representation, and democracy on social media and campaign blogs. These experiences are characterised by complex layers of contractors, council staff, and councillors involved in bureaucratic and technological systems that manage local authority housing stock.

Prominent scholars who engage with or are associated with issues of urban regeneration, including: Michael Edwards who works on relationships between property markets and planning that have driven London's extreme experience of the UK housing crisis (e.g., Edwards, 2016; Ball, Edwards and Folin, 2018); Lorreta Lees (e.g., 2010; London Tenants Federation et al., 2014) who addresses gentrification and urban regeneration; Lisa Mackenzie (e.g, 2013, 2015), whose activist work and ethnographic studies relate to class inequality, social justice, and British working class culture; Anna Minton (e.g, 2017; 2016), who addresses the polarisation and privatisation of cities; and Paul Watt (e.g, 2009, 2016; 2017), whose work covers social housing and activist campaigns within processes of urban regeneration. Notably, these scholars are all recognisable figures within housing campaigns as their approach to research often informs or directly supports activist efforts by providing resources that help make activists' cases for refurbishment over demolition and underlines the, often ignored, social and mental impact of regeneration (e.g, Crawford et al., 2014; Watt, 2019). This scholarly output, and more importantly, the visibility of academics' support of campaigns, indicates that academia can do so much more than merely comment on social justice issues.

Stephen Graham and Simon Marvin (1996, 2001) attempt to map the ways in which digital technologies shape the city and in doing so, straddle the worlds of urban studies and technology. Likewise, Ignacio Farías and Thomas Bender (2011) address the socio-technical implications of the urban environment. Through the lens of *media archeology* Shannon Mattern (Mattern, 2017, 2021) traces how, over thousands of years, flows of information, technical devices, and technical configurations have shaped the buildings, spaces, and experiences of the urban environment in, often messy and unpredactable ways. Such studies, which I categorise as *technical urbanism*, develop a mindset to recognise the directive capacities of database technologies within urban regeneration and bring a technological politics of regeneration to the fore.

Texts within technical urbanism provide a lens through which to observe a technical politics within urban studies literature that is not always immediately apparent. For example, Easton and others (Easton et al., 2019) recognise the limits and problems within attempts to *quantify or measure displacement* within gentrification. These urban studies scholars encountered issues related to the lack of data and difficulties of categorisation that never quite allowed them to grasp the evolving *micro-individual* realities of displacement involving, for instance, evolving spatial boundaries, the economic position of households, social mobility, and intimate personal experiences of gentrification. It is notable, therefore, that Easton and others recognise the importance of inferring the impacts of gentrification from sources such as social media or participatory methods − which underlines the limits of *knowing* a site such as Cressingham through metrics. By applying a techno-political analysis to their study, I can recognise how the technicalities and associations of national and local government surveys and datasets can contribute to displacement. This means that data and databases are *performative* because they do not simply report on the world, but actively participate in constructing what the world becomes through acts of categorisation − a key argument that I build on throughout this thesis.

More than a technical object

Vast swathes of computer science literature describe the database in technical terms. A search for *database* in the Association for Computing Machinery Digital Library (dl.acm.org) reveals 30,000+ articles that address highly specific aspects of database technology. A Google search reveals thousands of how-to articles and numerous technical histories by formative players in the field such as IBM (2003) or Oracle (2007). [2] However, this literature tends to present the database as a purely technical concern − a neutral agent divorced from a context such as urban regeneration that simply follows the predicable commands of a programmer or user.

Technical literature carries assumptions that work with data and databases starts with raw data. How-

2 As one how-to example, the Python Central website provides an excellent introduction to the technicalities of the relational database using the python programming language www.pythoncentral.io/introduction-to-sqlite-in-python.

ever, as STS scholars Minna Räsänen and James M. Nyce (2013) highlight, data and the structure of databases are pre-processed by work practices, political, practical, and other decisions that have all occurred well before data are collected. As Lisa Gitelman (2013) also points out, the notion of raw data is oxymoronic because data are pre-cooked by the time they reach a database. The technical register of the relational database, therefore, excludes a broader understanding of its implications.

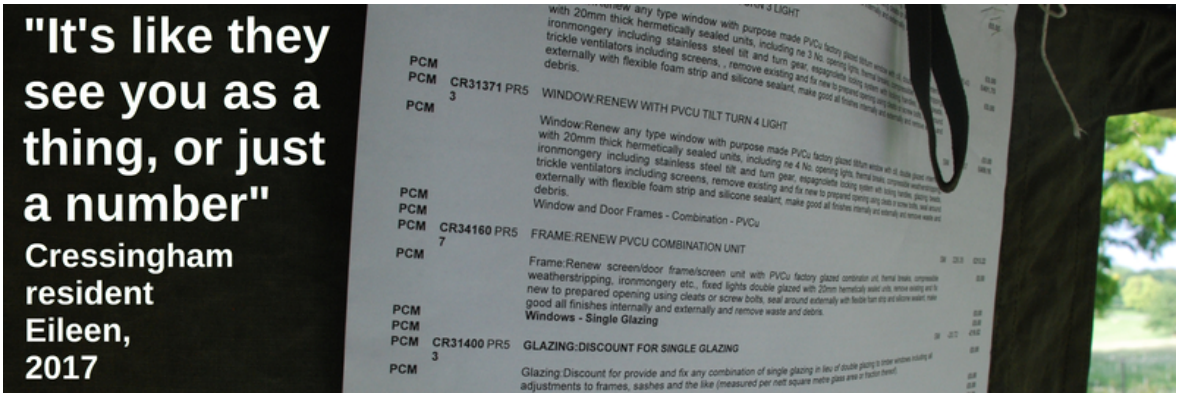


Figure 15. *Quote from Cressingham resident Eileen. Within the documentary film* Dispossession *(Sng, 2017).*

Notions of inclusion, openness, and accountability are commonly associated with technology. Open-data initiatives (Berners-Lee, 2009) encourage governments to share data so that citizens can participate in and hold democratic processes to account. As Gitelman (2013, p.14) underlines, however, data requires our participation: simply gaining permission to access data means little without the resources or expertise to critique it. This is a key finding that I discuss within chapters four to six of this thesis.

It is surprising that for a technical entity that is so prevalent and present in daily life, as Harwood (2013, p.2) observes, databases have largely avoided extensive critical, historical, or artistic exploration. However, scholarly work that addresses the technological, social, and cultural role of the database is burgeoning and typically draws on and contributes to the domains of media studies, cultural studies, and software studies. As software studies scholar Rob Kitchin (2017) highlights, critical literature helps to unpack the status, power, and ambiguities associated with databases, software code, and networks. Such literature invites an analysis of the database as a technical object with no clear boundaries, unpredictable relations, and characteristics that can change, iterate, or stabilise. This analysis acknowledges complex layers of association and avoids any definitive position when describing or observing the activities in which Lambeth's database systems are implicated.

Paul Dourish (2014), who works at the intersection of computer science, human-computer interaction, and social science, describes ambiguities within the term database. He observes how it can represent a collection of data, a technical term in computer science, or a whole relational database management system. Kitchin (2011; 2014) and Anna Munster (2013) address further ambiguity by highlighting that computational technologies, including the database, cannot be easily separated

from the computer networks, algorithms, and data with which they are entangled. This ambiguity revealed itself when I found myself asking whether I should include the software interface, datastore, or network configuration in my research on Lambeth's housing technologies. I addressed this question by accepting that each of these associations are involved in the collective functioning of Lambeth's housing technologies, and so, as such, each is a valid site of research.

To draw from the sociologist Andrew Barry and others (2008), research of Lambeth's database systems requires a shift of ontological imagination − from a database understood as a discrete software application with definitive functionality to a socially and culturally situated socio-technical entity with changing sets of associations and components. Here, Adrian Mackenzie (2002, p.16) introduces language to comprehend these associations when he identifies that what counts as technical, social, or cultural is far hazier than one might expect. In his book, *Wirelessness: Radical empiricism in network cultures*, Mackenzie (2010, p.200) invokes the term *wirelessness* to extend an analysis of wireless technology from the technical to incorporate the experience of the structure of networks. For Mackenzie, an experience of wirelessness incorporates such mundane actions as *jiggling plugs* in the back of a computer to ensure a device works (2010, p.6). Similarly, Davis Baird (2004, p.145) invokes the term *thingy-ness* to account for a multiplicity of association and diverse sets of negotiations that are embodied in technical objects. The terms wirelessness and thingy-ness therefore highlight the need for ambiguity, which I obtain through my use of art methods discussed in chapter three, when accounting for all the social, cultural, and technological ambiguities of Lambeth's databases.

Scholars who address computational systems as a cultural and social concern highlight issues of multiplicity when articulating what they are comprised of. For example, Agre (1997) observes that computational technologies have so many social and technological associations that they are impossible to comprehend in their entirety. Tahani Nadim's (2012, p.57) ethnographic study of genome sequencing databases illustrates that databases can be many things at once, including workplaces, archives, or contractual arrangements. Here, Simondon's (1958) concept of individuation that I examine later in this chapter is important because it articulates technical objects as evolving processes rather than static entities. For instance, individuation helps to acknowledge HARMS as continually evolving sets of associations, configurations, data, and practices that can be understood through technical, political, intrapersonal, economic, or other registers. It is notable, therefore, that individuation is recognised (e.g., Hayward and Geoghegan, 2012, p.3; Wright, 2015, p.80) as an influence in an actor network theory approach to technological research that considers the technical in terms of processes and sets of relations.

As well as a device operating in the present, the database is an assemblage of prior concepts and technologies. Database technologies emerged from various optimisations of data management that transformed how governments, wars, and even teashops operated. The field of media archaeology,

which emerged from Foucault's archaeology of knowledge (2002) and the work of media theorists such as Friedrich Kittler, Jussi Parikka and others (e.g., Kittler, 1995; Parikka, 2012; Mattern, 2015; Jucan and Parikka, 2018) provides a way to understand technological media through a close examination of the past. Furthermore, media artist Stephen Fortune (2014) describes a history of databases as an attempt to manage complexity from human tabulators taking eight years to compute the 1880 US Census to make sense of and act on a population, to the introduction of Herman Hollerith's punch-card machinery. Punch-card technologies remained prevalent in government and other office environments until the 1960s. In the 1940s electronic computers emerged like ENIAC (Electronic Numerical Integrator and Computer) which was used to calculate army ballistics trajectories (Edwards, 1997, p.51). ENIAC later inspired Lyons Teashop (Ferry, 2003) to create LEO (Lyons electronic office), the world's first electronic business computer that ran a *Bakery Valuations* application. Punch-card and electronic computer technologies drove ever-faster methods of data processing and storage such as reels of punched tape and eventually magnetic tape. It was not until the 1960s that modern databases emerged, including the hierarchical model exemplified by the folder structure of a contemporary operating system which was closely followed by the relational model as introduced in chapter one.

These and other histories are presented on the timeline in fig. 17. that points to an alignment of multiple technologies and ways of thinking and doing that made the relational database possible. This timeline helps question a single point of invention of database technologies and draws attention to the cultural and technological shifts in the ways that bureaucracies like Lambeth work with information.

Alison Adam (2008), whose work contributes to the domains of STS and software studies, provides a reminder that the database is fundamentally a list in its architecture, and that lists have been an organisational form since the earliest inscriptions of written language. The concept of HARMS as a list questions its status as a relatively new addition to the way we organise ourselves in the world. Here, James Beniger (1986) provides insight when he connects the machinery of steam power, railways, and the telegraph with the production of global information systems concerned with the material distribution of goods. Beniger (1986, p.38) argues that in order to understand human organisation we must look at how information is generated, stored, processed, and communicated to effect control. In doing so, he opens a space to consider information systems as various optimisations of humans, machines, and decision-making process towards particular goals. This provides a lens through which to observe HARMS as it coordinates a multiplicity of departments and individuals in Lambeth who act at a distance from the residents and buildings of Cressingham. Beniger's analysis also points to questions of power and its relation to information systems which Foucault's concept of power/knowledge provides additional language to articulate − as I discuss in the second half of this chapter.

Scholars who analyse the history of technical media, such as those discussed above, understand the productive and directive capacities of technical standardisation within society. Markus Krajewski's (2011) study of the card catalogue, for example, introduces the idea that standardisation, understood as an agreed-upon set of rules, has produced contemporary libraries of books, and systems of accounting. In his analysis Krajewski highlights the importance of the material properties of an information system. He illustrates how a database formed of cards and abstract codes such as the Dewey Decimal Classification system is able to order, record and act on the physical location or status of books, goods, and humans. In *Sorting Things Out*, Geoffrey Bowker (1996) emphasises that without the material and abstract forms of standardisation, it is not possible to build a modern housing development as electricity, gas, sewer, timber, bricks and screws, and nails, all depend on them. Simondon (2016, p.29) provides further insight here by stating that is not the production line that produces standardisation − rather, it is standardisation that allows the production line to exist. Following this line of thought, the standardisation of local authority housing services − exercised by database technologies − allows particular aspects and politics of maintenance and estate regeneration to exist.

Databases do the work of assigning things, people, and actions to categories that can have a devastating impact on people's lives. Scholars provide resources here through a recognition that databases have social, political, and ethical consequences (Kitchin, 2014, p.166). Bowker (2000, p.10) analyses these consequences by describing any classification system as a set of metaphorical or literal boxes into which things can be put to do some work. He goes on to highlight (Ibid., 26) that classification can become a direct tool to mediate human suffering, which is a germane point with regard to social housing given the nature of this study as well as the recent Grenfell disaster.

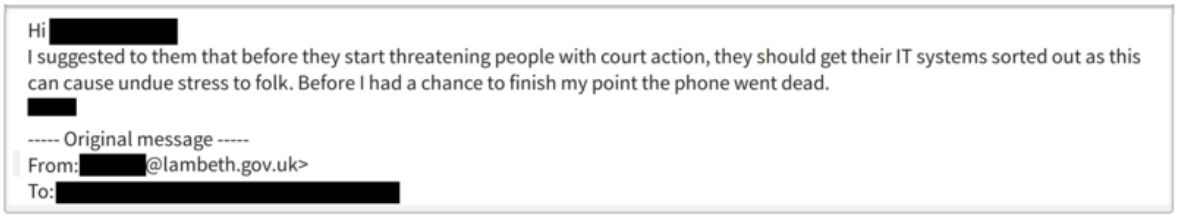

Hi [redacted]
I suggested to them that before they start threatening people with court action, they should get their IT systems sorted out as this can cause undue stress to folk. Before I had a chance to finish my point the phone went dead.
[redacted]
----- Original message -----
From: [redacted]@lambeth.gov.uk>
To: [redacted]

Figure 16. *A residents email discussing Lambeth's IT systems.*

Taking inspiration from Barry (2001), Lambeth's databases can be considered simultaneous political, technical, and commercial projects that configure possibilities of thought, action, and control. As political projects, those databases produce knowledge about Cressingham that is more accountable to a local party-political system than it is to residents. This is no surprise when considering that Lambeth's cabinet-leader mode of governance involves a 90% Labour Party councillor majority. As such, database systems are the enactment of political strategies that are mediated by complex and unfathomable fields of relations. Crucially, standardisation operating through the relational model facilitates rapid and continual changes of those power relations; this is arguably why residents struggle to combat its worst effects.

DATABASE COMPONENTS PRECEDENTS ECHOES

3500BC The development of writing (ca. 3500 BC) and the use of documents were critical to organised and consistent administrative systems. Although the term 'bureaucracy' was not coined until the mid 19th century, a concept of bureaucracy can be traced to ancient Sumer, where an emergent class of scribes used clay tablets to administer the harvest and allocate its spoils. Ancient Egypt also had a hereditary class of scribes that administered the civil service bureaucracy.

499 AD The first sine tables were created by the mathematician and astronomer Aryabhata in ancient India. These tables are a precursor to contemporary lookup tables that reduce computational load and data storage requirements (see 1979 below).

1613 The term *'computer'* first used by the Christian author Richard Braithwaite to describe a person who did calculations.

1614 John Napier discovered logarithms and made everyday use of the decimal point in arithmetic and mathematics.

1753 Jeremiah Milles, Dean of Exeter, pioneered the research questionnaire.

1786 Line, area, and bar charts of economic data invented by William Playfair.

1780s Major underpinnings of a commercial control structure through commercial banks.

1788 Watt's steam governor.

1800 Interchangeable parts.

1800 United States (US) system of bankruptcy.

1800 British shipping capacity exceeded 1.5 million tons.

1801 The pie chart and circle graph, invented by William Playfair, to show part-whole relations.

1801 Jacquard loom programmable by punch cards.

1810 Regular packet service to England from the US.

1810 Steam power was first successfully applied to printing.

1818 The first known English-language use of the word 'bureaucracy'. Combines the French word bureau (desk or office) with the Greek word kratos (rule or political power).

1820 Desktop calculators commercially mass-produced in Europe.

1824 Laws of thermodynamics developed out of a desire to increase the efficiency of early steam engines.

1830 Samuel Morse linked Baltimore to Washington with the telegraph.

1830S Ship-to-shore semaphore systems.

1830S The first railways.

1830S Specialized New York City workers called *"jobbers"* adopt fixed prices, publish catalogues, and mail them to customers.

1832 Babbage wrote, "On the Economy of Machinery and Manufactures".

1833 The design for Charles Babbage's steam-powered Analytical Engine contains the essential components of a digital computer: punch-card input and programming, internal memory, a central processing unit, and output to be printed or set into type.

1837 The telegraph was demonstrated and patented.

1838 The questionnaire was invented by the Statistical Society of London.

1839 First electric press.

1839 Photographic daguerreotypes.

1840S Packaging containers of fixed sizes and weights.

1840S A succession of innovations in scheduling, multi-system coordination, and centralisation of bureaucracy.

1844 The Rochdale Pioneers instigated the cooperative movement. Cooperative principles bind democratic processes with workers rights. They predate the interventionist state and the working class right to vote.

1850S Production line and staff structures produce the concept of a line manager.

1850S Standardised sorting, grading, weighing, and inspection methods.

1850S Railroads come to employ more accountants and auditors than the US federal or state government.

1852 Widespread use of postage stamps.

1850s-60s Modern accounting techniques.

1850 A growing network of grain elevators, warehouses, and mounting demand for mass storage and shipment of grain make it difficult to keep track of individual shipments of grain and cotton.

1852 Gyroscope. French physicist Leon Foucault creates a self-regulating device.

1858 Transatlantic telegraph cable links America and Europe. Service terminates after two weeks.

1858 Pencil introduced with an eraser attached.

1860S Emergence of bureaucracy in its modern form, complete with departments controlled by a hierarchy of salaried managers with differentiation and specialisation of bureaucratic control structures.

1860S Wholesalers organise the movement of goods and cash among hundreds of manufacturers and thousands of retailers.

1860S US travelling salesmen.

1860s-70s Professional managers.

1865 June 19th marked the end of slavery in the US.

1867 Automated rail signals.

1868 James Clerk Maxwell wrote "On Governors", the first theoretical analysis on control.

1870 The stock-ticker.

1873 James Clerk Maxwell theory of electromagnetic radiation brought in a new medium of electronic telecommunication.

1870S Systematisation of office record keeping.

1870s to 1880s Rapid bureaucratisation.

1876 Alexander Graham Bell patented the telephone.

1879 Cash register to order and control sales.

1879 Gottlob Frege's "Begriffsschrift" set out a formal system of logic.

1880 Modern offices contain paper business forms, file cabinets, directories and a telephone, use of international record carriers.

1880S Standardized clothing sizes.

1880S Elmer Sperry's early analogue computers.

1880S The information required to run a large business involving billing, sales analysis, and inventory proliferates in scope and complexity.

1881 Automated cigarette rolling and match manufacture.

1882 Henry Crowell applies continuous-processing technology to oatmeal which produces twice the national consumption and creates a need to generate new markets.

1883 Food canning.

1883 Adoption of a uniform standard time.

1884 Press clipping service.

1884 Long-distance telephone service.

1884 Photographic film processing.

1885 Dictating machine demonstrated and patented.

1887 Comptometer – modern office calculating machine.

1889 Punch-card tabulating machine created by Herman Hollerith, who was inspired by train ticket systems.

1889 Typewriters come into everyday use in US offices.

1890S Copywriting becomes a full-time specialty.

1890S Hans Berliner's gramophone.

1890S US capital investment in the office equipment industry rose by 194% compared to 64% for manufacturing.

1891 Prudential Life Insurance becomes the first commercial firm to use Hollerith equipment.

1892 Adding-subtracting machine with a printer mechanism created by William Burroughs.

1894 Card punch sorter could process fifteen thousand cards per hour to enact an automated data processing system.

1895 Cafeteria restaurant with a serving line opens in Chicago, inspiring self-serve supermarkets.

1899-1902 British army used wristwatches to synchronise troop movements in the Boer War, which developed an awareness of clock time.

1900 Automatic punch card sorter introduced commercially.

1903 Worlds first production line system.

1903 Wright brothers' first flight.

1905 Robert Whitehead develops a torpedo with a gyroscope to automatically control its direction.

1907 Transatlantic wireless communications.

1908 The Pittsburgh Survey. G. Stanley Hall used eight hundred workers to administer sixteen different questionnaires to around eighty thousand school children.

1910 The Photostat, a machine that creates photographic copies of documents on sensitised paper introduced by Eastman Kodak.

1910 Automatic bread plant opens in Chicago. Humans do not touch dough and loaves except when placed on a wrapping machine.

1910S Bureaucracies begin to realise that the same hardware that processes numerical data might process information more generally.

1911 Frederick Winslow Taylor publishes "The Principles of Scientific Management".

1914 The Audit Bureau use questionnaire surveys of magazine readership.

1916 Clarence Saunders opens the Piggly Wiggly grocery. A self-service store with aisles, turnstile, and checkout requires customers to pass by all displayed goods. Patented "means of processing customers" where control was in the floor layout.

1920S Statistical quality control

1920S Henry Laurence Gantt developed Gantt charts as a visual tool to show a projects' scheduled and actual progress.

1920S Electric printing calculators marketed.

1921 Percival White develops the concept of 'measurable markets'.

1922 George Radford's "The control of quality in manufacturing" solidified the idea that goods only had to be "good enough".

1924-1932 The Hawthorne effect. Experiments involving some twenty thousand indicated that the productivity of a workgroup increases as a direct result of any concern shown by outsiders in the group's activities.

1928 Attitudinal and opinion surveys.

1920S Multiple-register accumulating calculators linked as difference engines to produce data tables.

1928 80 column punch card adopted by IBM.

1930 Colorscope. A photoelectric cell reacts to colours more precisely than the human eye and produces electric currents capable of controlling machinery.

1931 Automated doors for commercial organisations.

1935 Electric typewriter introduced.

1936 Alan Turing describes a mathematical model of a general-purpose computer.

1938 A Symbolic Analysis of Relay and Switching Circuits is the title of a master's thesis written by computer science Claude E. Shannon. His thesis underlined that information could be treated like any other quantity and manipulated by a machine, which profoundly affected the first generation of computer pioneers.

1941 The world's first general-purpose, program-controlled calculator in regular operation created by Konrad Zuse.

1941 ENIAC (Electronic Numerical Integrator and Computer), the first programmable general-purpose electronic digital computer.

1951 The LEO I (Lyons electronic office I) was the first computer used for commercial business applications, created by J. Lyons and Co., a catering and food manufacturing company.

1958 The term 'folder' was introduced to computing and used in a hierarchical file system design for the Electronic Recording Machine, Accounting (ERMA) Mark 1.

1959 6-digit postal code nationally adopted in the UK.

1960S Emergence of computerised databases. In this decade, two popular data models included a network model called CODASYL and IMS, which was a hierarchical model.

1960 IBM developed the SABRE databases system to help American Airlines manage its reservations data.

1960 Charles Bachman developed a database system for General Electric.

1968 David Childs definition of the relational database.

1969 The first version of the UNIX operating system created by Kinneth Thompson and Dennis Ritchie, who were system engineers at AT&T's Bell Labs. Progressed ideas of time-sharing to share computing resources among many users (processes) through multiprogramming and multitasking dramatically lowered the cost of providing computing capability.

1970S Relational Database Management System (RDBMS) became a recognised term.

1970 Codd proposed a relational database model which changed the way people thought about databases. His model disconnected the logical organisation of a database from physical information storage and became the standard principle for database systems.

1972 Karen Spärck Jones established the basis for Search Engines. She combined statistics with linguistics to establish formulas that embodied principles for how computers could interpret relationships between words.

1974-1977 Two major relational database system prototypes were created. 'Ingres' used a query language known as QUEL and led to the creation of Ingres Corp., MS SQL Server, Sybase, Wang's PACE, and Britton-Lee. 'System R' used the SEQUEL query language and contributed to emergent SQL, DS, DB2, Allbase, Oracle, and Non-Stop SQL database systems.

1974 IBM System R database system built as a research project at IBM's San Jose Research Laboratory in 1974. System R was the first implementation of Structured Query Language (SQL).

1976 Robert Metcalfe and Robert Boggs experiment with ethernet packet switching on one kilometre of coaxial cable with 100 nodes.

1976 P. Chen proposed a database model called Entity-Relationship, which helped database designers focus on data applications instead of logical table structure.

1977 Unix first made commercially available by Interactive Systems Corporation.

1978 The Spreadsheet. Harvard Business School student, Daniel Bricklin, came up with an interactive visible calculator. Subsequently, Bricklin and Bob Frankston co-created VisiCalc, the first "killer application" for personal computers.

1979 VisiCalc introduced a LOOKUP function among its original 20 functions. Lookup tables were one of the earliest functionalities implemented in computer spreadsheets and are comparable to contemporary database functionality.

1980S SQL became the standard query language.

1980S Relational database systems became a commercial success as the rapid increase in computer sales boosted the database market. The IBM Personal Computer helped develop database systems and products such as PARADOX, RBASE 5000, RIM, Dbase III and IV, OS/2 Database Manager, and Watcom SQL. DB2 became the flagship database product for IBM.

1980S The Galaksija computer . A craze in 1980s Yugoslavia inspired thousands of people to build computers in their own homes. The idea was to make technology available to everyone.

1985 ARM1 computer processor containing 25 thousand transistors.

Early 1990s New client tools for database applications include Oracle Developer, PowerBuilder, and VB. Tools for personal productivity also emerged such as ODBC, Excel, and Access.

Mid 1990s The advent of the Internet led to the exponential growth of the database industry. Average desktop users began to use client-server database systems.

Late 1990s Increased investment in online businesses resulted in a rise in demand for Internet database connectors, such as FrontPage, Active Server Pages, Java Servlets, Dream Weaver, ColdFusion, Enterprise Java Beans, and Oracle Developer 2000.

Late 1998 The acronym NoSQL was first used in 1998 by Carlo Strozzi to describe an open-source relational database that did not use SQL.

2007 10gen software company began developing the NoSQL database system MongoDB.

2000S NoSQL databases are increasingly used in big data and real-time web applications. Prominent systems include MongoDB, ElasticSearch, DynamoDB (built by Amazon), HBase, and Cassandra (built by Facebook).

2016 The Bank Of England's Real-Time Gross Settlement (RTGS) service is the infrastructure that holds accounts for banks, building societies and other institutions. RTGS handles transactions worth around 500 billion pounds a day.

Figure 17. Fold-out: Database components, precedents, echoes.

Human/technical components of the relational machine

The concept of the database as a relational machine originates in the work of Graham Harwood (2013, p.18) who considers how a systematic collection of information comes into existence within an organisation as a consequence of the relational model. As a conceptual device, the relational machine makes it possible to follow associations without being restricted to the technical definition of a database. The concept proposes that a relational database is more than a software application sitting on a computer somewhere, and that information processing is not merely the work of a computer processing chip. It is important to highlight that my ongoing use of the term *machine* is derived, in part, from a fragment of political theorist and philosopher Karl Marx's (1993, p.692) notebooks. However, I do not want to mislead the reader into thinking I am now taking a Marxist philosophical approach, although it is worth highlighting that Marx did inform Simondon's work and this usage of machine aligns with Harwod's appropriation of the term.

The relational machine allows me to conceive of HARMS as having numerous abstract, computational, mechanical, and human components during my engagement with it. As a collective, these components are many processes that endeavour to fulfil, though they do not necessarily achieve, predetermined goals. A collective endeavour accounts for the relational machine as a domain of action informed by archives of data, taxonomies, and historical precedents (Harwood, 2013, p.18). HARMS as a collective breaks down the hierarchy between human and non-human where each holds the potential to structure power dynamics within, for example, the production of new knowledge and material action on Cressingham. This is a radically expanded and critical version of relation with regards to databases as it encompasses material, social, technical and political processes that play out in specific environments and thus does not reduce the relational to purely technical operations.

Harwood's theorisation of the relational machine resonates with Callon's (1998, p.20) STS analysis of the controversy surrounding the development of the electric vehicle involving EDF's (Électricité de France) definition of its technical characteristics and the social universe it would inhabit. As with Harwood, Callon provides a means to describe socially and materially heterogeneous systems in all their fragility and obduracy. Callon sets out a mode of analysis that acknowledges the *co-evolution* of society, technical artifacts, and knowledge within the electric vehicle, arguing that such vehicles involve more-than-technical components that range from electrons, electrodes, consumers, government regulation, activists campaigning for environmental concerns, and social and cultural transformations within a post-industrialised society. With echoes of Simondon's theory of individuation − as set out in the final section of this chapter − Callon (1998, p.23) notably states that "in the absence of one ingredient the whole would break down." which underlines the reciprocal nature of technical objects and the collectives and environments they participate in and make. The point I make here, is that the concept of the relational machine emerges from traditions of academic

thought that abandon definitive boundaries between what is technical, natural, scientific, human, and non-human. This opens space for analyses of how database machinery is inseparable from the material social, cultural, and political world that it emerges with.

Conceptualising relational databases as having all kinds of relations that extend beyond technical configurations or data structure brings insights into their social implications. For example, Anna Munster (2013, p.77) examines how databases and networks accelerate and multiply how and where data can be worked with and thought about, thereby speeding up action at a distance. She describes how the relational database organises nodes (fields of data) that can be infinitely multiplied, rearranged, and retrieved within its internal mechanisms and logics. Munster also discusses how this relationality extends outwards where multiple humans or machines can simultaneously access, alter, and insert data from multiple geographic locations within microseconds of each other − operations that are made possible and sustained by application programming interfaces and ever-changing network architectures.[3] The social implications of databases technologies, therefore, are that humans and devices become detached from distant processes that are products of such database technologies. This detachment has ethical implications, as it dissipates accountability. In this case, such detachment arguably accelerates the decline of social housing estates like Cressingham.

The idea that humans are part of computational systems is well established. The term "computer", for example, was first used by the Christian author Richard Braithwaite (1613) to describe a person who did calculations. Beniger's (1986, p.167) articulation of nineteenth-century human auctioneers and commissioning agents as programmable information processors, therefore, is not a radical or new proposition. Mackenzie's (2002, p.118) seminal work *Transductions* that analyses and draws from Simondon's (2016) theory of individuation describes how arrangements of people have allowed technical objects like the database to come into existence through long histories of industrial processes, computing technology, and network infrastructures.

Notably, both Beniger and Mackenzie recognise how histories of technological invention shape the ways in which bureaucracies can think and act as a collective of multiple human and technical components. They introduce a sensibility, therefore, that can recognise how a diversity of humans, artefacts, interests, institutions and practices make government housing database systems what they are. Accordingly, through this conceptual lens I can observe how the human components of HARMS − such as call operators, housing officers, programmers, regeneration officers, surveyors, and contractors − are partially stripped of their humanity and autonomy as their possibilities of action and thought are directed by the logics of the databases that actively construct a culture of maintenance, repair, and urban regeneration on Cressingham.

3 An Application Programming Interface (API) is code that allows disparate software application to communicate with one another. Just as a GUI makes it easier for people to use computer software, an API makes it easier to connect separate computer systems and processes.

I argue that any entity, human or otherwise, holds potential to transform another in intimate ways, a position that recognises both human and technological agency. My need to stretch my hand to alleviate the repetitive strain injury caused by my laptop is testament to such an effect where, over the years, I have negotiated with different chairs, trackballs, computer mice, and laptop stands to maintain an optimal physical orientation to reduce pain. I draw from Mackenzie (2002, p.111) to support this argument, where he discusses how humans and non-humans negotiate what a socio-technical collective can achieve and where its limits are. In discussing these limits, he outlines how artifacts cluster around computational systems such as diagrams, manuals, codes, standards, and computer displays though they are typically not recognised as such. As Mackenzie [Ibid, 211] emphasises, the technological is a *site where human and technical agency is entwined* which points to relationships between technologies, human bodies, the environments they inhabit, and human and technological agency that collectively blur the understanding of what a database is and does.

Simondon (2016, xvi) identifies humans as coupling devices capable of resolving incompatibilities between machines. As such, humans should be understood as components of database machinery. However, humans do not simply transmit information because they are sentient and thus autonomously perceive, feel, respond to circumstance, or follow independent agenda. The human components of a database system, therefore, inhabit an ambiguous space between automaton and autonomous as they filter and pre-process information (consciously or not) before it is recorded in a database. This makes humans an important site of enquiry within this project. This ambiguity between human and machine is key to this thesis because this is where, I argue, both individual and collective aspirations for technological, cultural, and societal change are formed and contribute to the politics of urban regeneration.

Scholars working at the intersection of philosophy and cognitive science have addressed the relationship between technologies and human cognition to add nuance to the idea that humans are components of database systems. Clerk and Chalmers (1998), for instance, argue that computational systems are an extension of our memory capacity where the environment plays an active role in driving cognitive processes. This supports the idea that database systems shape human aspirations. Further, Edwin Hutchins (1995, p.153) describes a process of distributed cognition in his analysis of the navigation of a US naval ship through which a ship's crew interacts with each other and navigation technologies to effectively understand and control the ship. Specifically, Hutchins (Ibid., 114) articulates how an internal tools mindset (how someone thinks about doing something) and external tools such as a GUI (where they go about doing something) are part of the same ecology of thinking and doing within a specific environment.

I connect these discussions of human cognition with Simondon's (2016, pp.18–21) argument, which I set out later in this chapter, that technical objects have a mode of existence within abstract ideas. In doing so, I articulate HARMS as a space in which people go about knowing and a space that

transforms human, institutional, governmental, and commercial ideas and possibilities of action. For example, I have observed how HARMS: has altered mine and other residents' political views and practices by transforming us into activists, public speakers, and community representatives; structures access to and knowledge of Lambeth's housing and regeneration practices and services; exists within residents', workers, and politicians mental map of Lambeth's technical systems − accurate or otherwise; and is evident within programmers imagination of repairs and maintenance practices represented and enacted through code categorisations. The abstract and intrapersonal, therefore, are important sites of exploration in this project in which technical abstractions within the relational model and human aspirations are as much a part of urban regeneration as any material artefact, such calculations of repairs costs within my paper service statements (see fig. 69.) or cabinet reports.

Power/knowledge and the discursive space of HARMS

Foucault's (1926-1984) influential body of work introduces a concept of power/knowledge that articulates relations between power, knowledge and institutional control. In the following, I primarily draw from two of Foucault's works to consider and work with HARMS as an evolving field of relations through which knowledge and power dynamics take form. First, *The Archaeology of Knowledge* (1969) provides conceptual tools to articulate how knowledge emerges and gains authority through Lambeth's databases and wider bureaucracy. Second, *Discipline and Punish: The Birth of the Prison* (Foucault, 1975) analyses the formation of disciplinary power within the administration of the prison and provides language to discuss multiple versions of power and its enactment. These texts introduce concepts of *statements* and *institutional truths* that are formed through *discursive spaces* and *non-discursive practices*. In combination, these concepts describe power as something that is *exercised*, or *performed* and takes form in association with the formation of knowledge. Notably, Foucault does not employ the exact term *power/knowledge* in the two books cited above. However, a later collection of works and interviews titled *Power/Knowledge* (1980, pp.37–52) does utilise the term. As Sarah Mills (2003, p.69) observes of his work, Foucault provides an important theoretical advance in the discussion of knowledge because he emphasises that knowledge is an integral part of struggles over power.

Foucault (2002, pp.49, 94) proposes that particular kinds of statements are made possible and take form within a discursive space. With frequent reference to the development of ideas within the scientific discipline of medicine, he describes a statement as something more than a vocalisation, written sentence or book. He (1995, pp.31, 94, 146) suggests that graphs, statistical calculations, and even the arrangement of keys on a keyboard can be thought of as statements within a discourse. Crucially, Foucault's definition recognises that statements: always have a materiality along with spatial and temporal coordinates; are functions of what can be distributed, said, written, or thought about; link to the situations that provoke them, the consequences they gives rise to, and the statements that

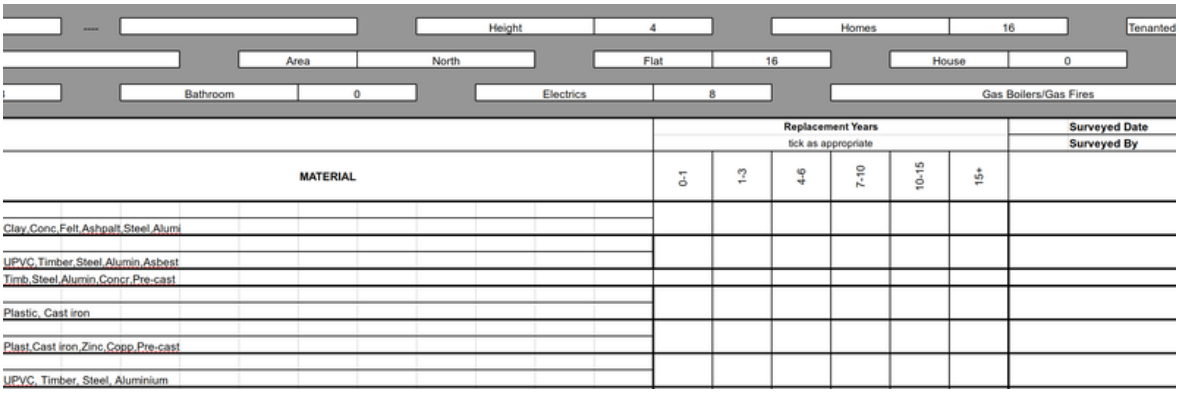
proceed and follow them. Therefore, a discursive space is understood as a field of relations between groups of statements, discourses, and different kinds of technical, material, economic, social, spatial, or political events.

The value of a statement, as Foucault (2002, p.136) suggests, is its capacity for circulation and exchange within a discursive space rather than its truth. Here, truth refers less to a binary position of true or false and is rather a system of ordered procedures for the production, regulation, distribution, circulation, and operation of statements (Foucault, 1980, p.133). Following Foucault, the discursive space of HARMS can therefore be understood as a site in which Lambeth's institutional truths take form, making any statement an object of political struggle. However, it is important to acknowledge, as Harwood (2013, p.24) highlights, that Foucault developed his concept of a discursive space before the widespread adoption of database machinery so it primarily addresses discourse that has not been processed by digital technologies. Therefore, additional theoretical resources, provided by my discussion of the algorithm later in this section, are required to conceptualise the database as a machine that produces institutional truths.

Foucault's (1995, p.215) concept of discipline opens consideration of different kinds of power and their relationship with knowledge. Foucault (2002, p.29), describes discipline in terms of a genealogy of ideas that involve the displacement and transformation of concepts, as well as ideas of governance, training, or the regulation of conduct. Discipline, therefore, points to the space between an accumulated body of knowledge and a type of disciplinary power where, as Foucault (1995, pp.215–216) puts it, the modality of its exercise comprises of instruments, techniques, and procedures of governance. Crucially, Foucault (2009, p.192; Lemke, 2001, p.191) understands governance in the broadest sense as procedures that change conduct in an attempt to regulate the self or others.

Power, as Foucault (1995, p.161) variously argues, can be understood as: an exercise and effect of strategic positions; something transmitted by and through individuals that adds a bio-political dimension; the formation of truths in a disciplinary space; or something that takes form in a field of relations. Power is therefore not simply the product of law and government or a frontier between classes, even though it can be articulated in this form. Rather, power is a relational process that has multiple modes of operation and requires ongoing enaction. Foucault's concept of power, as the sociologist Nikolas Rose (2006, pp.86–88) − who is typically associated with the field of governmentality − highlights, undermines a common perception of government as the origin, beneficiary, or terminal point of power. Through this mode of reasoning, Lambeth's databases can be observed to *intersect with* and *perform* multiple scales and modes of power that distribute and regulate the behaviour of both Lambeth workers and Cressingham residents. These scales range from individual database codes and primary keys to departmental strategies and those of local and national government − all of which I discuss through chapters four to six.

Lucas Introna (2015), who works within traditions of STS, examines the ethics and politics of technology within organisations and discusses how calculative practices involving databases and algorithms are enacted as technologies of governance. Introna draws on Foucault's concept of governmentality and the sociologist David Lyon's (Lyon, 2003, p.1) concept of social sorting to articulate how database systems, with their underlying algorithms and codes, calculate and regulate practices such as academic writing. Introna illustrates his thinking through an analysis of the academic *Turnitin* database system that searches texts for plagiarism. Notably, Introna identifies how subjects of such systems self-regulate as a form of social sorting that arises from systems of categorisation. Lyon's concept of social sorting describes how computational classifications within surveillance databases in commerce or policing, are designed to indirectly and directly influence and manage populations. Database systems, therefore, permit access and participation in social events, experiences, and processes. Such permissions are enacted on Cressingham through inaccessible codes and networks that categorise, sort, and organise data along with the humans and environments they represent.



		Height	4		Homes	16		Tenanted				
	Area	North		Flat	16		House	0				
	Bathroom	0		Electrics	8			Gas Boilers/Gas Fires				
									Replacement Years tick as appropriate			Surveyed Date / Surveyed By
MATERIAL									0-1	1-3	4-6	7-10	10-15	15+	
Clay,Conc,Felt,Ashpalt,Steel,Alumi															
UPVC,Timber,Steel,Alumin,Asbest															
Timb,Steel,Alumin,Concr,Pre-cast															
Plastic, Cast iron															
Plast,Cast iron,Zinc,Copp,Pre-cast															
UPVC, Timber, Steel, Aluminium															

Figure 18. *Extract from Lambeth's* Decent Homes Standard *survey obtained via a FOIA request.*

A core critique of Foucault's work in relation to this research is that first, he does not directly address the agency of technical objects. Second, Foucault's analysis of the prison (1995) or a scientific discipline such as psychiatry (2002, pp.54, 185) is not directly comparable to Lambeth's management of housing services. Regarding the first point, Simondon's theory of individuation that I discuss later in this chapter provides the necessary tools to address the agency of technical objects. Second, as others recognise (e.g., McKinlay and Starkey, 1998, p.25), the prison is an extreme form of organisation so is not typical of contemporary institutions. As such, because Lambeth is clearly not an institution of total control I knowingly take Foucault's lexicon out of context. Likewise, Lambeth's housing practices are not a formal academic discipline directly comparable to scientific disciplines like medicine. It is important to acknowledge, therefore, that Foucault's and other theorist's concepts provide momentary lenses to address a messy world of humans, technical objects, and associated practices rather than attempting to formulate a definitive philosophical view.

Algorithmic governance

Algorithms are a necessary part of the operation of databases and literature that addresses algorithms elucidates how components of databases are involved in the regulation of human conduct, which connects with Foucault's understanding of governance. Computer scientist Robert Kowalski's (1979) succinct descriptor "Algorithm=Logic+Control" identifies a logic component of algorithms that specifies the knowledge used in solving problems and a control component that determines the strategy through which that knowledge is used. Kowalski's description of logic and control resonates with Foucault's concept of power as something that is exercised during the formulation of knowledge. It is important to note, however, that Kowalski's analysis stems from fields of mathematics, computer science, and software engineering so his interest is in the technical structure and efficiency of algorithms within a computer. This analysis can exclude a wider understanding of algorithms where, as software studies scholar Andrew Goffey (2008, p.16) draws attention to, they are suggestive of action in the world and thus have implications beyond the technical.

Critical studies of algorithms are recognised (e.g., Plummer-Fernandez, 2019, p.36) to span many disciplines including sociology, anthropology, STS, media studies, legal studies, and communication. Such studies address the social, cultural, and political implications of algorithms alongside their technical aspects. Tarleton Gillespie (2014, p.1), for example, analyses search engine algorithms and discusses how they select what is most relevant to us. Within his analysis, Gillespie argues that algorithms subject human discourse and knowledge to procedural logics which introduces political ramifications to their operation. Notably, Gillespie (2014, p.3) suggests that a sociological inquiry into an algorithm must always grapple with the database to which it is wedded and that both algorithm and database should remain analytically distinct. While this distinction might be important to an analysis of search engine algorithms, it is not so useful when applied to HARMS because the edges of what constitutes algorithms, databases, or human endeavour are not always clear. For example, the socio-technical algorithm of a Repairs Job, as I discuss in the chapter five, would cease to function if any of the following components were to disappear, including its abstract existence as a data-construct, computer networks, databases schema, programming code, a series of human actions, contractual agreements, legislation, and many other more-than-technical associations.

Agre (1994, p.109), introduces the concept of a *grammar of action* that provides an additional tool to consider intersections of human conduct and algorithmic processes and codes. In his (1994, p.108) analysis of surveillance technologies, Agre observes that codes structure human behaviour as a kind of grammar of action that represent the day-to-day activities of an organisation. He considers how those representations emerge as formal language that is imposed on human activity. In HARMS, such grammar takes the form of "Raised", "Authorised", "Complete", and "Issued" categories that, for instance, point to sets of more-than-technical operations. Fuller (2012, p.116) provides additional nuance here when he describes the capacity of the database to logically order and sort things

both outside and inside its technological confines. Furthermore, Goffey's (2008, p.18) argument that algorithms operate on themselves, machines, and on humans suggests that algorithms, as with databases, affect the world in which they participate. Identifying grammar's of action, therefore, points to the social and cultural intersections of human endeavours with formal code constructs. Notably, Goffey considers algorithms as a type of Foucauldian statement that operate within a machinic discourse. Through this observation Goffey points to entanglements of human and machine discourse that orientate each other towards unforeseen directions. It is within this interplay, I argue, that human aspirations become infused and mediated by the affordances of database technologies and their algorithmic process.

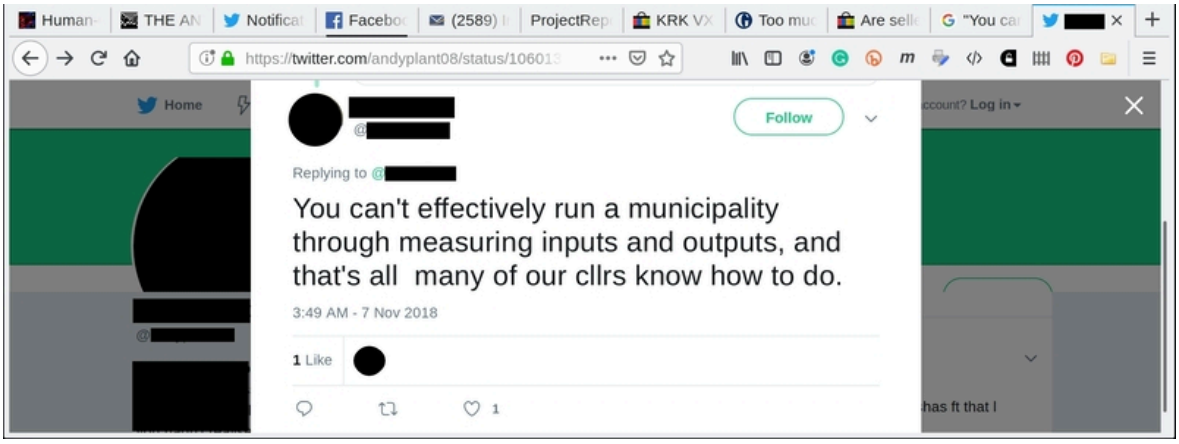


Figure 19. *Edited tweet by a housing activist.*

Simondon and the aspirational database

This section now introduces Simondon's (1958) theory of *individuation* that he developed through his dissertation *The Mode of Existence of Technical Objects*. Individuation provides a particular understanding of databases that informs how HARMS can be understood. Through individuation, I argue that HARMS mediates conflicting aspirations to repair and demolish Cressingham that are simultaneously a technological, social, and cultural construct. Here, Simondon's concept of *technicity* is central to my argument because it identifies the characteristics of technical objects that, as Simondon (2016, p.71) puts, impart a human desire for change. His concept of the *technical individual* then articulates HARMS as an ongoing evolutionary process with moments of coherence. Finally, associated concepts of *milieu* and *phasing* describe how transformations within HARMS are the product of internal and external relations which connects with Foucault's relational understanding of power/knowledge through a consideration of how relations of power and knowledge emerge within a field of relations. In summary, individuation describes how HARMS moves through successive phases of structural reorganisation to present new possibilities of action and versions of governance.

Although influential scholars of technology cite Simondon's work, it has been slow to gain recog-

nition in the English-speaking world. The burgeoning interest it is now receiving is in part due to recent English translations (e.g., Simondon, 2016, 2020) and Latour's (2013) book *An Inquiry into Modes of Existence* which underlines the influence of Simondon to his work. Gilles Deleuze (2001), Mackenzie (2002), Isabelle Stengers (2004), Tiziana Terranova (2006), and Latour are recognised (e.g., Iliadis, 2013; Chabot, 2013, p.2), to have drawn on Simondon's theories in their evaluation of how we think about technology, identity, and materiality which are vital considerations in an analysis of Lambeth's database systems. Deleuze and Guattari are recognised as having been hugely influenced by Simondon's work, even if their references to him are limited (Iliadis, 2013, p.83).

Simondon's (2016, p.33) seminal theorisation of the internal combustion engine and the electronic tube (used in radios and early computers) provides a perspective on technical objects before the mass adoption of computers. For Simondon, abstract concepts are as much a part of a technical object as any material manifestation, which is a salient point considering the abstractions of computational systems. For example, Simondon (Ibid, 18) recognised how the calculating machines of the twentieth century were energised by the abstractions of information theory as a replacement for theories of thermodynamics.

The technicity of a utopian machine

Simondon (Ibid, 26) introduces the concept of technicity to consider how technical characteristics are a driver towards technical perfection. He describes (Ibid, 44) technicity as the essence of a technical object that can be recognised because it remains stable across an evolving lineage. Simondon (Ibid, 28) argues that this essence is productive of both structure and function and provides an example of the design of the thermal combustion engine which has evolved through multiple versions that can be understood to have arrived at a logical and optimised conclusion. Before discussing Simondon's analysis of the combustion engine is important to address an apparent technological determinism that this conceptualisation can impart. I argue that this is not a determinist position because it acknowledges an interplay between human ideas, technical characteristics, and the surrounding environment of a technical objects all of which have directive capacities within more-than-technical negotiations. The act of making a chair out of wood provides a good example here where the body, human intent and skill, ideas of relative dimensioning (Knipfer, 2005) (where comparable sizes of cut pieces are more important than their exact measurement), available materials, wood grain, tools, and work space all impart different kinds of logic that collectively shape the final form − meaning technical objects involve all kinds of ideas, situatedness, materiality, and negotiation.

Simondon (Ibid, 28) describes how, at its core, the combustion engine controls the release of gas where successive properties of wood, petrol, and diesel fuels have instigated a shift from external to internal combustion which has altered both the structure and function of what these engines can achieve. Simondon (Ibid, 27-28) also discusses how the integration of a technical object into a larger collective (such as cooling fins introduced to the engines above) raises issues of compatibil-

ity where technical problems are either resolved or cause tension. He argues that resolution tends towards coherence, whereas incompatibility can reconfigure a collective. In an analysis of technicity, Mackenzie (2002, p.217) adds that technical objects are actively involved in finding a resolution as they negotiate or coerce a particular outcome within processes of collective reorganisation. Put simply, technical characteristics, such as difficulties with connecting to a database over a network, cause something not to work as intended which triggers ideas in humans to change things.

A distinction between human aspiration and the possibilities afforded by technological objects is not always clear. Humans operate in a margin of indeterminacy as a coupling device between machines (Simondon, 2016, xvi) − they reconfigure collectives as they strip away the inessential, invent new components, and devise new processes. Humans, therefore aspire to optimise technical objects. However, this aspiration is not just a human construct as the possibilities and limitations of technological objects shape what that aspiration becomes. According to Simondon (Ibid, 18, 50, 55), humans are inventors capable of resolving incompatibilities, so to some extent, technical objects are determined by human choice. As inventors, humans aim to realise the best possible compromise with technical objects which can temper human aspirations into new forms. For example, Lambeth's database systems structured initial aspirations to repair Cressingham and also orientate future aspirations to demolish.

Individuals, their milieu, and phase-shifts

Simondon (2016, p.26) introduces the concept of a technical individual to describe how the individuality of a technical object is modified throughout the course of its existence. Simondon (2016, p.25) suggests that technical individuals are perfected within fluctuating fields of tendencies and tensions where usage unites heterogeneous structures and operations. For Simondon, as the philosopher Marc De Vries (2008) highlights, a technical object should be considered a sequence of designs and iterations rather than a singular entity. However, when a technical object is considered as a process, it can be difficult to define its genesis because it undergoes a continual modification of its associations and being. Here, the concept of the technical individual helps to recognise moments of coherence rather than define something in absolute terms. This proves particularly useful when addressing a world of urban regeneration in continual flux as well as the inaccessible and abstract components of HARMS.

The relational database always maintains its existence as an abstract concept within an abstract computational machine − the electronic computer. As such, further conceptual resources are required to engage with these layers of abstraction. Here, the programmer and theorist Yuk Hui (2016, p.24) develops the concept of a *digital object*, which brings Simondon's 1958 theory of the technical object into the contemporary age of digital technologies. Hui (2016, p.109) specifically identifies the relational database as a driving force in the emergence of digital objects and their transformative relations. In doing so, Hui considers how digital objects such as JavaScript Object Notation (JSON)

or the eXtensible Markup Language (XML) carry information between separate technical systems. As with humans, therefore, digital objects work to couple distant systems and in doing so instantiate and distribute complex sets of associations.

Simondon's (2016, p.59) concepts of milieu and phasing propose that technical individuals both condition and are conditioned by the environment in which they reside. Simondon (Ibid, 62) describes how a technical object has an associated milieu that maintains its existence and provides the example of an organ in a body that cannot exist without the body as each maintains the other. His (Ibid, 58, 173) concept of phasing works with milieu to highlight the recursive relationship a technical object has with its environment. Phasing is described by Simondon (2016, p.173) as an aspect that results from a splitting of being in opposition to another aspect. Phasing articulates how the milieu of a technical object can instigate a transformation, or a *phase-shift*, as it connects with another objects milieu. Thus, in combination phasing and milieu consider a causality of worlds than can instigate change in both a technical object and its associations.

The philosopher Georges Canguilhem (2001) provides a historical analysis of the term milieu.[4] He (2001, p.25) describes how milieu is associated with notions of a fluid intermediary between bodies, or as a vehicle that enables the transmission of forces between distant points. Simondon (2016, p.55) draws from this imagery to describe how technical objects are located at a meeting point between associated milieu that are not necessarily compatible. The milieu of separate technical objects, therefore, constitutes a field of relations that must be resolved before they can operate as a whole – this invites questions about their technical, social, and cultural implications. Here, Susanna Lindberg's (2019, p.300) observation that a Simondian technical object should be expressed in terms of community and as humans *being-with* technical objects rather than instruments that are *used* by humans, opens consideration of their wider associations. Notably, Lindberg (2019, p.309) also finds that Simondon does not deal with milieu as a political place which indicates that human experience and action cannot be fully addressed within Simondon's conceptual framework. Furthermore, Paul Dumouchel (1992, p.417) highlights that Simondon's reduction of the *use of* technical objects to a minor role is problematic because the relationship between technology and its social use is too important to be dismissed. These are important criticisms because it is through the use of technical objects that their limitations and affordances become known in relation to the environments they inhabit and share with humans.

4 Canguilhem, it is worth highlighting, was influential to Simondon as his supervisor, and to Foucault within the context of the history of science, and more specifically health and disease. Foucault wrote, for example, the introduction to Canguilhem's (1989, p.91) *Normal and the Pathological* which address entanglements of humans, technology, environment, and the production of knowledge.

Why individuation?

In the view that the individual, or the singular, is *the process* rather than its cause Simondon prefigures Deleuze and actor-network theory (ANT). However, I chose individuation over related theories of technology, such as ANT, for three distinct reasons.

First, I found that individuation provided vocabulary to address the many layers of abstraction within Lambeth's database systems, particularly when expanded by Hui's concept of the digital object. Initially, the concept of actor-networks promised sharp theoretical tools to describe social and technological entanglements. Latour's (1991) examination of the *Berlin Key* provides an impressive example of this. However, as Latour (1996, 2004, p.63) and others have highlighted (e.g., Michael, 2016, p.26), I found that ANT brought too many associations with the language of computers. The relational machine with its codes, network infrastructure, computers, and human components is unfathomably complex, mostly invisible, and has so many layers of abstraction that the lexicon of actors, networks and black boxes proved a hindrance. Here, Simondon's (2016, pp.149, 250) frequently returned-to images of fluidity, margins of indeterminacy, and moments of crystallisation better captured socio-technical processes.

Second, I was stuck by Simondon's (2016, p.26) ability to address minute technicalities and then switch to theoretical analysis. Simondon's approach resonated with my attempts to analyse the many registers that Lambeth's database systems presented within this research project. Likewise, his use of image and diagram pointed to a way to engage with highly technical detail in the midst of a theoretical analysis and vice versa. While this kind of discussion and articulation is, arguably, also a feature of ANT, I found Simondon easier to work with because in the literature that surrounds his work there is less focus on the practice of science, or social science, than there is in the literature that surrounds ANT. After all, I do not consider myself to be a scientist or sociologist and housing management is not a scientific discipline − so a scientific focus is only partially relevant to my work as an activist, artist, designer, programmer, and resident engaging with government housing database systems.

Third, both Mackenzie and Harwood's work indicated that individuation provides the necessary conceptual tools to specifically address database technologies. These tools aided my research on the complex arrangements of technical objects, from simple paper bills to expansive and primarily invisible networked database systems. Mackenzie (2002, pp.81, 193), for instance, draws from Simondon to describe multiple scales of technical objects − from a hand-axe to hugely complex genome database systems. Harwood's (2013) use of individuation provided examples of a theoretical and practice-led enquiry into database technologies that pointed to ways that I could integrate Simondon's concepts into art, design, and activist practices.

A weakness in Simondon's evolutionary understanding of technical objects, as Pascal Chabot (2013,

p.47) observes, is that the driving force of his critique is ontological and so, as Laura Lotti (2015, p.23) argues, it does not address issues of capitalist exploitation to instead focus on techno-cultural normativity. This can sideline ulterior human economic, commercial, or political interests. Foucault's formulation of power/knowledge can step in here to fill this conceptual void through his consideration of both discursive and disciplinary spaces. This connection with Foucault avoids considering humans as entirely subservient to database systems and thus excusing them for the decisions that they make. Rather, through individuation, I articulate how Lambeth's databases create the context within which specific decisions can be made. It is then up to an individual to determine which decisions are taken − though it is not always clear whether humans or technical artefacts are the driving force behind particular outcomes and aspirations.

Simondon provides a mode of reasoning that encourages an active engagement with abstract concepts, bodies, material and digital objects. This engagement can identify how human aspirations are shaped, transformed, and coextensive with the technicalities of HARMS. Concepts of technicity, the technical individual, milieu, and phasing introduce a vocabulary that engages with all the transience of HARMS and urban regeneration. They develop, as Mackenzie (2002, p.210) puts it, a feel for the peculiar role of technologies in our collectives. They provide resources with which to examine the emergence of new capacities and potentials rather than accept a human-centric design process as given. At one moment, for example, a Lambeth surveyor appears to be a critical component of Lambeth's database systems. Then, at another moment government legislation or a block-id number energises the situation as Muriel Combes (1999, p.10) would put it.

Conclusion

The aim in this chapter was to articulate and engage with the multiple registers and ambiguities I encountered in my artist and activist-led research of Lambeth's housing management technologies. Through this chapter, I have developed the notion of the aspirational database as a conceptual tool to address the implication of database technologies through multiple technical, material, theoretical, historical, political, ethical, and intrapersonal registers.

Harwood's concept of a relational machine helped conceive of Lambeth's database systems as having numerous abstract, computational, mechanical, and human components to which I collectively refer as HARMS. Foucault's concept of power/knowledge then introduced language to articulate databases in terms of *the exercise of* and *intersection with* multiple scales and modes of power. Power/knowledge, therefore, points to the space between an accumulated body of knowledge and a type of disciplinary power where the modality of its exercise comprises of instruments, techniques, and procedures of governance − a discursive space of machine codes and government statements. Finally, I drew from Simondon's theory of individuation and associated concepts of technicity, the technical individual, milieu, and phasing to describe HARMS in terms of successive phases of structural reorganisation. In combination, these theoretical resources articulate how HARMS transforms

and reconfigure human aspirations within processes of urban regeneration.

It is important to stress that, while this theoretical framing precedes the methodological and empirical chapters, the concepts it introduces emerged through my technical, creative, and activist work on Cressingham. Specifically, these theoretical resources help to articulate the complexities of HARMS and inform strategies to fight their worst effects through the @SaveCressingham campaign. This chapter, therefore, should be understood in terms of the way it was written – as an iterative and exploratory device to help think and make with database technologies in Lambeth.

Chapter 3.
Methodology: How to investigate inaccessible government databases

Introduction

This chapter presents the methodological rationale that has guided and informed the artist- and activist-led research that I have developed over the course of this investigation into Lambeth's housing database systems. I describe some of the locations, processes, and organisations that I encounter in my attempts to access and intervene in the operation of these databases. This description points to the systems' inaccessibility, my commitment to the residents, and the many ways I engage with both residents and Lambeth. I then introduce John Law's (2004) formulation of a method assemblage and Agre's (1997) critical technical practice (CTP) as my overarching methodological approach that incorporates art, activist, and technical work alongside research into theories and histories of technology. I situate these methods within traditions of action research and argue for the relevance of the methods that include my concept of Almost Workshops informed by traditions of participatory design; arts techniques such as defamiliarisation and dysfunction; building contraptions; writing code and prose; annotation; and creating diagrams. Finally, I argue for an ethical approach that acknowledges years of pre-existing activist work and address how most aspects of my life intersect with this project.

The setting

As outlined in chapter one, Cressingham is a 1970s council estate that is under threat of demolition by Lambeth which claimed that "the database told us Cressingham was too expensive to repair" during a public meeting in 2012. Lambeth now seek to demolish all 306 homes on Cressingham then build 464 in their place to meet a 2014 Lambeth Labour Party aspiration to build 1,000 new council homes in the borough. Of the 158 additional homes proposed by Lambeth, the majority are cited for private sale or rent with only 23 targeted for council rent. This demolition and rebuild approach to urban regeneration is prevalent in London, where www.estatewatch.london, a research project and estate resident resource, reports that over 100 of London's council and housing association estates are currently under threat of demolition.

Lambeth's databases have been a part of my existence since I moved to Cressingham in 2006. I encounter these databases as metrics of repair, tenancy figures (i.e., number of secure, temporary, and leasehold tenants), estimates of refurbishment, and other figures that constitute a Lambeth-defined view of Cressingham that @SaveCressingham contests through a legal and activist campaign. I encounter these databases each time I report a repair to my home, receive a service charge bill, contest a repair, or observe a contractor working. As an illustration, I recently spent two days reviewing service charge bills and discovered a 2,000% increase in electricity charges and issues with repairs affecting multiple blocks and residents on Cressingham. Correcting these errors involved months of telephoning Lambeth's call centres, communicating with residents, listing Job ID numbers (primary keys), writing code to calculate costs, reading my lease, reviewing legislation, issuing

an FOIA request, discussing the issue with the Cressingham Gardens Resident Management CIC (CGRMC) committee (see fig. 20.), writing to my MP, and communicating with the leader of Lambeth Council. My investigation of Lambeth's databases, therefore, is a many-faceted engagement that encounters abstract codes, devices, humans, and multiple organisational structures associated with Cressingham.

The *CIC* in *Cressingham Gardens Resident Management CIC* stands for Community Interest Company. This is a type of company introduced by the UK government in 2005 the profits of which are reinvested for the benefit of the community rather than shareholders. Residents setup CGRMC after a majority of secure council tenants voted to progress their Right to Manage (RTM) and Right to Transfer (RTT) in 2019. CGRMC took over the previous functions of the Residents Association and is setting up the management of all repairs and maintenance costing under £5,000, anti-social behaviour, management of car parks, and estate cleaning. The CGRMC committee consists of eight directors, including myself, who are currently negotiating a management agreement and eventually aim to take over ownership of the estate from Lambeth. A successful RTM application allowed residents to hire their own staff, such as an estate director, who Lambeth have assigned access to aspects of their databases systems. Crucially, committee members such as me do not have access to these databases because of the General Data Protection Regulation (GDPR). However, members meet with Lambeth (see fig. 21.) and can obtain some information via the estate director rather than making long-winded FOIA requests as was previously the case.

Figure 20. *CGRMC committee meeting in the Rotunda November 2019. Discussing the implementation of the RTM process.*

The walkways, green areas (see fig. 24.), and a community building called the Rotunda are important locations on Cressingham where information about the estate is disseminated and acted on. The Rotunda is used for CGRMC committee meetings, seasonal parties, a children's nursery, and discussions about repairs and regeneration. The building is also used for democratic events such as Annual General Meetings and voting, and provides space for councillor and MP *drop-in* sessions with residents. In Cressingham's outdoor areas, residents chat, share information, and observe Lambeth's surveyors, contractors, and others performing their work. My involvement in these locations and activities enables a nuanced understanding of how information flows through Cressingham, technical infrastructures, democratic events, and informal modes of communication.

As buildings on Cressingham impact how residents access information and organise themselves, they are contested sites in themselves beyond residents' efforts to prevent their demolition. For example, at a 2018 Residents Association Annual General Meeting, a Lambeth representative threatened to remove the Rotunda from community use unless residents signed a new Residents Association constitution that had been written by Lambeth and with which residents did not agree. Further controversy arose regarding Lambeth's refusal to pay accrued Rotunda hire-charges to the Residents Association for consultation events. One outcome of this conflict was CGRMC's instigation of legal action against Lambeth for non-payment and Lambeth's use of buildings on another council estate for resident meetings. Furthermore, Lambeth converted a former home on Cressingham into a regeneration site office. CGRMC members argue that a council home should not be used for this purpose and that the office is part of Lambeth's attempt to circumnavigate the resident-elected CGRMC and impart a sense of resident approval for Lambeth's proposals.

Lambeth's consultation events generate a mass of paper and digital information that can be difficult for residents to comprehend, access, or manage. These events include public meetings at the Rotunda or elsewhere, exhibitions of development plans, workshops (e.g., design, finance, eco-retrofit, planning), door-to-door survey's, online live-video presentations, telephone conversations, and craft activities for children. These consultations are surrounded by information packs, letters, emails, officer reports, illustrations, and cost calculations of demolition and rebuild. This information is infused with the language and practices of local authority decision-making, housing management, planning, community engagement, financial modelling, and the disciplines of architecture, law, surveying, and more. This barrage of information can be impenetrable for residents because of the range of expertise required to engage with it. This issue is compounded by difficulties in accessing information (such as financial viability assessments) within meandering consultation exercises with no clear deadlines that can suddenly switch into formal processes where council decisions are agreed.

Figure 21. *Visitor pass to gain access to Lambeth's offices. Used for a meeting between council officers and CGRMC committee members to discuss the RTM process.*

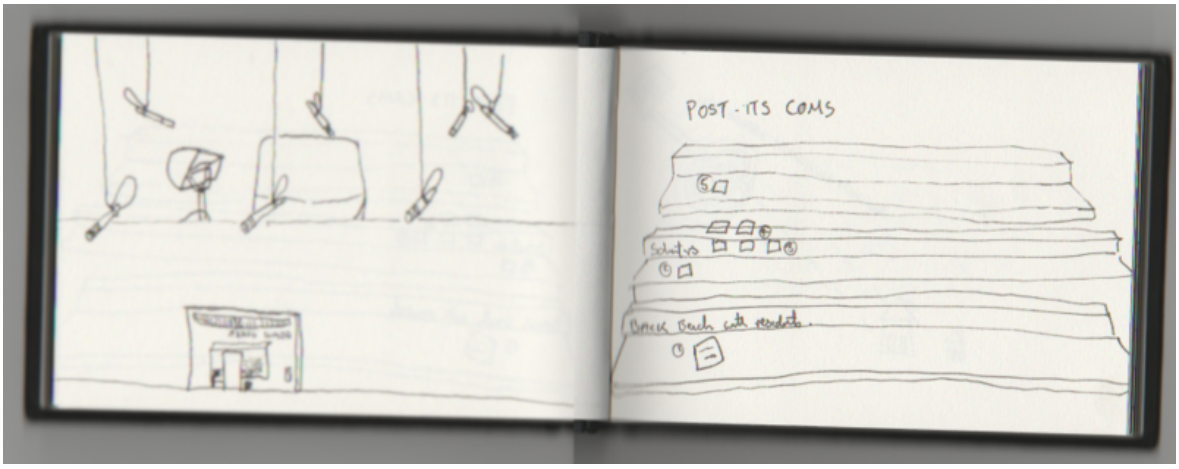


Figure 22. *My sketches of Cressingham's 2015 judicial review proceedings as a technological space. Highlights the microphones used to record proceedings and post-it notes passed between activists and lawyers.*

As these decisions are subject to judicial review, consultations are a forum of legal strategising both by activists and the council. These strategies are informed by legal actions associated with other council estates such as the Heygate and Aylesbury council estates in London, which have seen the compulsory purchase of residents homes and thousands of properties demolished against residents' wishes. Notably, a recent publication (Sendra and Fitzpatrick, 2020) that collates strategies by seven London communities to resist demolition, including Cressingham, offers an avenue of hope, beyond judicial review, in the form of community-led regeneration projects, as expressed through the Cressingham Peoples Plan (Cressingham Residents, 2016).

@SaveCressingham does not have a formal structure or membership. Some of its contributors have casually referred to it as an anarchist group with *no leaders or masters* although it does not adhere to clear anarchist principles.[1] Broadly speaking, however, @SaveCressingham adopts consensus-based decision-making where core-contributors obtain consensus before any major undertaking. The structure of @SaveCressingham allows for some of its contributors to be anonymous, which is important because it reduces Lambeth's ability to target individuals. For example, some tenants report a fear of *speaking out* against Lambeth in case this affects their tenancy. Notably, @Save-Cressingham contributors communicate with a network of activist groups in Lambeth and beyond, such Save Central Hill and The Peoples Audit, all of whom share vital expertise and insight about regeneration in Lambeth. @SaveCressingham, therefore, is a multidisciplinary space that opens access to expertise outside of the estate.

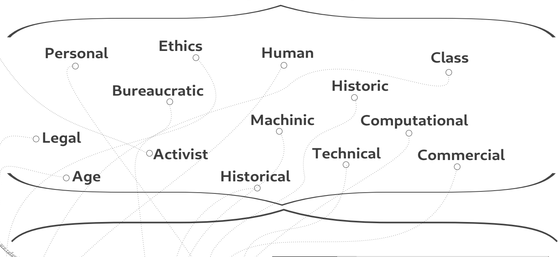
Social media provides a space to amplify the work of the @SaveCressingham campaign and test ideas in a public setting. I particular, Twitter is a space to connect with and share knowledge with housing campaigns across the country and directly counter statements made by Lambeth in the public realm. Rather than hide behind an anonymous handle my personal social media presence as *@anthillsocial* on Twitter points to my merged identity as an artist, technologist, academic, and resident of Cressingham. As with talks I have given outside academia (e.g., party political, arts, and resident-instigated events) Twitter has helped me present my arguments beyond academic audience as it is inhabited by my neighbours, family, activists, and housing professionals. Social media also provided a space to think and make with theoretical ideas as illustrated by figure 23. which explored multiple registers of urban regeneration there were evident within a single Twitter thread.

1 After many years of campaigning some core contributors to @SaveCressingham noted that its organisational structure shared similarities with anarchist models of organisation. My reference to *no leaders or masters*, therefore, riffs off the anarchist and labour slogan *no gods, no masters* which has been in common use by anarchists in England since the late 19th century (Guérin, 2005).

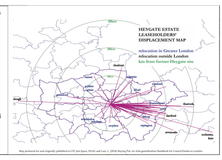
REGISTERS OF REGENERATION AND DISPLACEMENT

TWITTER

REGISTERS



This graphic was produced by "Southwark Notes" after Southwark Council evicted residents from the Haygate Estate then demolished 1214 homes.



.css hack to extract of full twitter threaded discussion for print across multiple pages, or export into a vector image format for this large scale print

```
1   .flex-module{
2     display:none;
3   }
4   .global-nav-inner{
5     display:none;
6   }
7   .global-nav{
8     border:none;
9   }
10  #timeline{
11    display:none;
12  }
13  #page-outer{
14    display:none;
15  }
16  html body div#permalink-overlay,
17  html body div.permalink-overlay{
18    position:fixed;
19  }
20  html body .tweet p.TweetTextSize--jumbo{
21    font-size:14px;
22    line-height: 20px;
23    margin-top:-8px; 24 }
25  .icon--close{
26    display:none;
27  }
```

HTML, CSS, and Javascript code mediate the production, experience and dissemination of knowledge.

Embedded in semi-visible systems of standardisation, network configuration, and database architectures.

The technical characteristics of html/ css/Javascript/database combinations have temporal, social, political, and technological dimension.

Simple alteration of code snippets change socio-technical relationships. The addition of .css code, for example, facilitates new printing methods.

Visualisations are easily misread. The aesthetic dominates.

As residents move home underlying database queries INSERT and UPDATE records that represent their new existance and enact new kinds of control.

Who created the "didn't seek rehoming" category? Was it a designer or council officer? Is it defined in a database or spreadsheet column? Who, what, and which processes determine households included under this heading?

Sure is...

A bitter irony of regeneration is that the threat of demolition brings people closer together at the point at which they will be broken apart.

You learn about people who have lived in an area their whole lives and come to rely on the support of those geographically close to them. Any stress or change to those social ties fundamentally changes peoples lives bu this is not accounted for in metrics of regeneration that focus on numbers of homes and costs.

it is... one might imagine alternative (resident defined) data structures which enage with this level of displacement

A stated aim in Lambeths cabinet reports is to increase rent and living costs in an area post-regeneration. This equates to an increase in land value and future rental income which goes to fund (through private sale) the financial cost of demolition and rebuild.

Housing metrics hide the total number of people displaced through regeneration as a local authority can identify a family of four as a single Tenant. Or private renters are simply ignored.

Any technical artifact (not just twitter) can govern how things are discussed. The A4 paper standard, for example, allows for the dismeniation of cabinet reports that can be printed on contemporary printers. This standard was based on a German standard from 1922.

Activists struggle to communicate this level of complexity. 'Others' can include the general public, the court, residents, journalists. The nuance of residents lived experience is always lost and constructed anew through ever changing human-technical collectives, modes of thought, and action as can be observed in this Twitter thread.

Public consultations emerge in concert with datasets (repairs, surveys, attendance at events) that residents have little or no say in devising

On Cressingham, councillors frequently attempt to create division between different groups that are percieved to live on the estate.

Metrics and statements of followers, tweets, re-tweets and replies work to validate the legitimacy of messages.

Unseen and underlying database, network, and code infrastructures produce an experience of social media that reconfigures an experience of time. Revisiting this Twitter thread online, for instance, instigates various database calls, caching mechanism, and computational process that reconstruct a sequence of messages that are not always in the order that I first experienced them.

A technical reading of displacement metrics invites speculation over housing database data structures. Tables and columns that structure and model contractual agreements, and regenerative processes of a local authority.

Both Lambeth and Southwark Tenants (leasehold, secure, temporary) are organised, recorded, reported and acted on through database tables.

Each category of tenancy has associated practices and procedures which produce the representation of a tenant in a database.

```
CREATE TABLE "homes" (
  "id" INTEGER NOT NULL PRIMARY KEY,
  "estate_id" INTEGER,
  "estate_walks_roads_ways_id" INTEGER,
  "block_id" TEXT,
  "address_number" TEXT,
  "address_postcode" TEXT)

CREATE TABLE "residents" (
  "id" INTEGER NOT NULL PRIMARY KEY,
  "first_name" TEXT, "last_name" INTEGER,
  "email_address" TEXT, "telephone_number" TEXT)

CREATE TABLE "documents" (
  "id" INTEGER NOT NULL PRIMARY KEY,
  "title" TEXT,
  "file_name" TEXT,
  "file_path" TEXT,
  "date-created" TEXT)

CREATE TABLE "tenancy_type" (
  "id" INTEGER NOT NULL PRIMARY KEY,
  "name" TEXT,
  "description" TEXT)

CREATE TABLE "estate_resident_tenancies" (
  "id" INTEGER NOT NULL PRIMARY KEY,
  "documents_id" INTEGER,
  "tenancy_types_id" INTEGER,
  "start_date" DATE,
  "end_date" DATE)
```

Developers (including local authorities) produce financial viability assessments in response to legislation and policy which define % of affordable housing in any new development. Categories of aordable, council rent, private sale are merged into metrics of Net Present Value little understood to those outside of the field of accounting.

	Option 1 – full refurbishment	Option 2 – part redevelopment/ part refurbishment	Option 3 – part redevelopment/ part refurbishment	Option 4 – part redevelopment/ part refurbishment	Option 5 – comprehensive redevelopment
Number of net additional homes	0	19	20	72	158
Number of new, replacement homes at Council rent	0	7	17	93	212
Number of new, additional homes at tenancy	0	11	12	35	75
Net Present Value for refurbishment	-£662k	-£523k	-£526k	-£493k	n/a
Net Present Value for redevelopment (base scenario)	n/a	£2.6m	£1.27m	£3.15m	£824k

Lambeth councils proposed regeneration of homes makes no guarantee that residents who currently have a garden attached to their property would be offered home with a garden in a newly build estates. If a family with children are forced to relocate, access to a garden can be a decisive factor which is unaccounted for in metrics of displacement presented as choice.

eretn groups that are percieved to live on the estate.

THREAD

ANALYSIS

Figure 23. *Fold-out sheet: Diagram of a Twitter discussion with in situ notes. Explores multiple registers of regeneration.*

Figure 24. *Poster advertising the residents RTM vote. Attached to a Lamppost.*

The many activities, organisations, and spaces I engage with in this project provide multi-faceted views and understanding of Lambeth's database systems. These range from residents auditing repairs bills, to my work with CGRMC and @SaveCressingham, everyday chats with my family and neighbours, or processes of reporting and chasing repairs. This project, therefore, requires that I integrate all aspects of my life into my research methods. To echo the practice-led research of Kat Jungnickel (2018), I make things to make sense of things on Cressingham. The things I made in this project include spreadsheets, databases, code, and a bike trailer, all of which I discuss through chapters four to six. In summary, the process of making these artefacts involves making sense of how information about Cressingham comes into existence, travels, and is acted on as a product of Lambeth's database machinery − while recognising that I can only obtain partial views of how those systems operate.

Method assemblage and a critical technical practice

The setting of Cressingham introduces many methodological questions to this research project, as does my understanding of Lambeth's database systems which I developed in chapter two through Foucault's concept of power/knowledge and Simondon's theory of individuation. Namely, how can I research Lambeth's databases if they are difficult to access, ambiguous, distributed, and con-

tinually changing? What methods can I employ to decipher the power relations between abstract, material, and human components within discursive and non-discursive spaces associated with Cressingham and Lambeth? How can I intervene in the operation of these databases while meeting my different obligations as a researcher, activist, parent, and homeowner?

To address these questions I draw on John Law's (2004) concept of method assemblage and Agre's (1997) CTP (incorporating art as a method of enquiry) as a principle part of my assemblage methodology. This methodological approach combines activist, art, making, design, and programming activities alongside research into theories of technology and histories of technical invention. Activity is a useful term because it does not force a distinction between home, activist, or academic life so describes a process of engaging with multiple unfolding events. Within these activities the method assemblage I develop here produces qualitative data in the form of text, lists, spreadsheets, programming code, GUIs, directory structures, material objects, images, audio and video recordings. These methods include participant observation; my concept of Almost Workshops informed by traditions of action research and participatory design; arts techniques such as defamiliarisation and dysfunction; building contraptions; writing code, prose, and annotation; and creating diagrams. Both method assemblage and CTP are key to the setting of Cressingham because they support an artist- and activist-led orientation to research that intersects multiple disciplines.

The outcomes of this work include my long-term involvement with the @SaveCressingham campaign, published activist and academic texts (e.g., Keene, 2018b, 2019, 2021), online documentation (www.db-estate.co.uk), Almost Workshops (deciphering service charge bills, cabinet reports, and housing data), physical contraptions, programming code, diagrams and annotation − all of which I discuss in the next section. In combination, these methods are a way of critiquing, observing, documenting, influencing, and revealing the ways that Lambeth's databases act on Cressingham's buildings and mediate the conduct of its residents.

I situate my methods within an academic tradition of participant observation, which is a qualitative research method that can be traced back to the work of Beatrice Webb (1926) in the 1880s and the Chicago school of urban sociologists in the 1920s (Park et al., 1925). Arguably, participant observation has its roots in ethnography and involves taking part and becoming familiar with everyday practice to observe its everyday performance (Lüders, 2004, p.222).

Scholars (e.g., Lichterman, 1998; Uldam and McCurdy, 2013, p.942) recognise that participant observation is suited to activist settings where the researcher observes and participates in social action as the action is happening. My participant observation on Cressingham, therefore, is a qualitative study involving my long-term engagement and support of Cressingham residents who have fought Lambeth's plans for demolition since 2012. This engagement fosters trust with residents which allows me to observe intricate human interactions with Lambeth's technical systems in different organisational settings. However, because I cannot observe or participate in all aspects of Lam-

beth database systems this method of research provides vital techniques to address their ambiguous, inaccessible, messy, and continually changing characteristics.

Method assemblage

John Law's (2004) concept of method assemblage helps me engage with the ambiguities of this project. Law (ibid, 2) describes method assemblage as an attempt to remake social science so that it is better equipped to deal with mess and disorder. Method assemblage helps me to engage with the inaccessible, distributed, ambiguous, and heterogeneousness nature of Lambeth's databases by considering, as Law (ibid, 2) puts it, how they produce knowledge and objects in practice. As I established in chapter two, such practices include Lambeth's endeavours to collect and act on information about Cressingham within a discursive space of codes, spreadsheets, computer networks, cabinet reports, legislation and other such abstract and material artefacts. Notably, these endeavours are surrounded by a hinterland of practices and artefacts involving workers, contractors, residents, councillors and others at various layers of government, commerce, and technological infrastructure. Method assemblage, therefore, directs a way of investigating a multiplicity of practices and objects that contribute to my and others experience of HARMS.

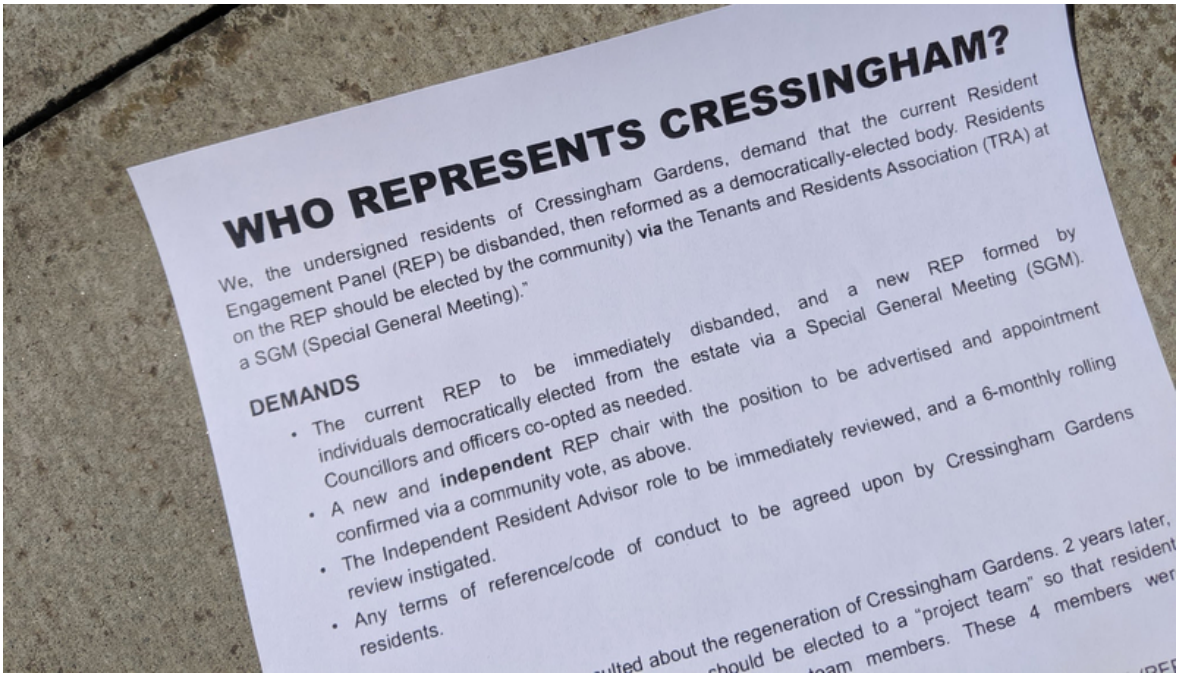


Figure 25. *Petition instigated against Lambeth's Resident Engagement Panel. Cressingham's Residents Association deemed the panel to be undemocratic. Lambeth ignored the request.*

Law's (ibid, 41) suggestion of going beyond research methods of interviews and questionnaires is pertinent to this project. Such methods cannot capture the socio-technical intricacies of how information about Cressingham is produced because so much is hidden from view or not understood − even by those who use Lambeth's database systems every day. Law (ibid,41) goes on to propose that tacit knowledge, computer software, communications systems, and overtly political and eco-

nomic agendas can be valid methods of research. I take up Law's proposal, therefore, to incorporate these and other methods to experience, observe, instigate, and intervene in how information about Cressingham comes to be. In doing so, I gain a sense of how components of Lambeth's databases instantiate and enact power relations between Cressingham's residents, Lambeth, and beyond.

Law problematises the role of the researcher as someone who produces reports of a singular objective reality. He (2004, p.31) argues that humans with their practices and methods are involved in generating the realities of world they participate in so they cannot step out of the world to obtain an overall view from nowhere. Law's observation is important because I cannot make any claim to academic impartiality in a situation where I stand to lose my home and am fighting for a resident-led version of regeneration against Lambeth's proposals. Method assemblage opens the space for personal narrative and impartiality in a consideration of how database technologies, and indeed my own research methods, produce the multiple realities of urban regeneration. These methods assemble multiple narrative accounts in the form of text notes, programming code, diagrams, audio, and video material that render visible the practices of working with data, programming, reporting repairs, and contesting plans for demolition. Crucially, this is a method of tracing how the human and technical components involved in assembling those accounts produce realities of repairs, maintenance, and regeneration on Cressingham.

To paraphrase the design scholar Alex Wilkie (2010, p.64), method assemblage amounts to an STS approach to ethnography where the empirical is actively constituted out of additions and relations between bodies, objects, practices and words. My research methods, therefore, pay particular attention to how the abstractions and materiality of technical objects enact the different realities of Cressingham. This is an experimental approach that recognises the performative aspects of technology where scholars argue (e.g., Marres, Guggenheim and Wilkie, 2018, p.19) that social life is something that is made rather than simply exists. However, it is worth underlining that while I follow a similar theoretical and methodological trajectory, I do not characterise this project as an STS approach to research (which frequently incorporates ANT) that my use of method assemblage might imply.

A critical technical practice

The concept of a CTP was introduced by Agre (1997, p.132) as an attempt to reform the field of Artificial Intelligence (AI) by providing it with the critical methods of interrogation. For Agre (1997, xii), a CTP integrates critical reflection on practice as part of the practice itself, exemplified by his engagement in technical work alongside a historical and theoretical analysis of the field of AI. Agre explored how AI emerged in computer science from early attempts to model human thought to contemporary machine learning techniques through which systems can recognise and learn from patterns in data. Specifically, Agre proposed that a CTP should involve technical work, personal analysis, and an exploration of the institutional, intellectual, and financial origins and implications

of a technology. This was a radical departure from Agre's academic origins in computer science, which is primarily concerned with the functionality and efficiency of software and hardware. Thus, as part of a method assemblage, a CTP helps me combine technical, activist, and theoretical work to explore ethical and other implications of Lambeth's databases beyond a technical register.

A fork of Agre's CTP, initiated at the former Centre for Cultural Studies between 2007-2017 at Goldsmiths, University of London (Harwood, 2019) − where I studied for my Masters of Arts entitled *Interactive Media: Critical theory and Practice* − is influential for this project. This version of a CTP incorporates art as a method of enquiry that helps address the unrecognised, ambiguous, and unknown aspects of Lambeth's databases. The art from which this fork draws is closely associated with the somewhat elusive term media art (Bolter and Grusin, 1999), which contrasts traditions of painting and sculpture to incorporate mechanical, electronic, and other forms of media into its practice. Media art is an umbrella term that encompasses concepts of net art (Corby, 2006), art hacking (Bradbury and O'Hara, 2020), and connects with ideas of making, craft, Do it With Others (Furtherfield, 2008), and cultures of Free (Libre) Open Source Software (FLOSS) and hardware.[2] Artists associated with this domain, such as YoHa (YoHa, 2019) and Critical Art Ensemble (Critical Art Ensemble, 2001), tend to be technically and socially engaged while working across multiple disciplines. The methods of research that this version of CTP introduces, therefore, are well-placed to support cross-disciplinary and collaborative practices that connect with the social and technical concerns of this project.

My use of the term HARMS, introduced in chapter one, is a central methodological device in this project because it allows for ambiguity and draws attention to a conflation of human and technological concerns. Notably, this usage emerged with my concept of the aspirational database as an arts technique (a fiction) to consider any component or process that *feels* associated with Lambeth's databases as part of their functioning. The word feel is important, as are the words aspiration and harm, because they emphasise human entanglements with database technologies. This emphasis shifts focus to what Lambeth's databases *do* and human relationships *with* them rather than what they definitively *are*.

Foucault's concept of power/knowledge and Simondon's theory of individuation are integral to my use of a CTP and are embodied in my use of the term HARMS. Power/knowledge introduces a sensibility to recognise technical, personal, and institutional associations with Lambeth's database systems and the harm they do. Agre (1997) cites Foucault's (2002) Archaeology of Knowledge as an influence in developing a CTP and my theoretical framework connects with this approach. In

2 FLOSS refers to software that is freely distributed with access to source code so that it may be scrutinised, edited, or distributed with many different software license agreements. Closed-source software is distinct from FLOSS in that access to its source code is restricted. Many authors have provided extensive histories and conceptual background to these practices of software development (e.g., Stallman, 2002; Lessig, 2004; Raymond, 2001) and the Free Software Foundation (www.fsf.org) provides excellent up-to-date information about this domain of work.

contrast, Agre does not cite Simondon in his formulation of a CTP although Bernhard Reider (2011), a scholar of digital culture, proposes in a blog post that a CTP is *pretty much* the same challenge that Simondon set himself. On Cressingham this challenge involves multiple methods that help to identify, comprehend, and articulate intricate more-than-technical practices and relationships with Lambeth's database technologies while recognising that they cannot be fully explained.

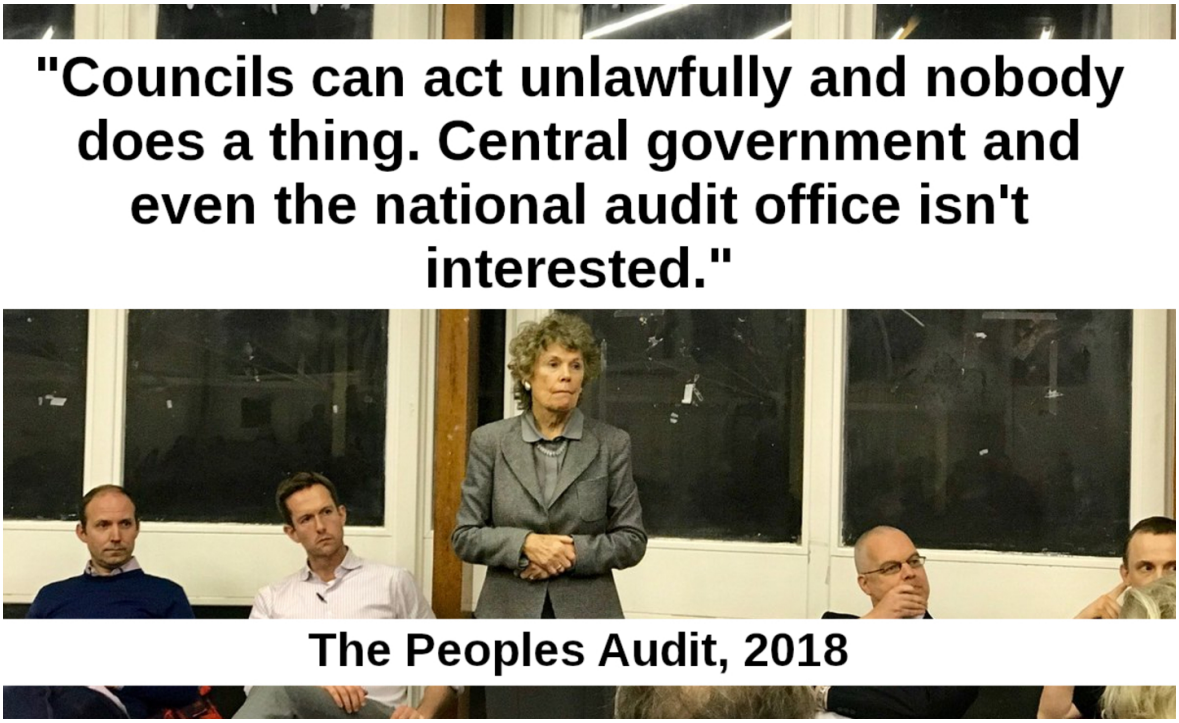


Figure 26. *A public meeting on Cressingham and quote from a campaigner. Organised by* The People's Audit *and chaired by MP Kate Hoey, 2018.*

Lambeth's database, associated practices, and technical objects are distributed between machines and humans, geographically dispersed, and materially and technically difficult to gain access to. These databases produce all kinds of technical, ethical, material, intrapersonal, economic, and political outputs and outcomes with which my method assemblage and CTP attempts to engage and enact. These methods open space for uncertainty because much of the world of urban regeneration is enacted in an uncertain manner. Indeed, critical urban geographers Leslie Kern and Heather McLean (2017, p.410) call for a recognition of uncertainty regarding the causes, outcomes, and impacts of urban processes. I argue, therefore, that acknowledging ambiguity helps to critique and introduce alternative modes of thought to dominant technical, political, and economic forms of analysis that offer explanations based on what is already known. As such, method assemblage and CTP research methods explore technological forms of governance that are difficult to identify through other means.

These research methods are performative (Mills, 2010); they are a process of *doing* research involving pre-existing research methods, practices, and human and technical components. They are also a process through which methods, practices, and components simultaneously constitute one

another. This raises questions of human and technical agency and ideas of objective truth within coextensive research, technical, art, design, and activist endeavours that simultaneously produce the world they participate in. The Shadow Database introduced in chapter six, for example, is a process of working with and exploring existing relational database and departmental structures within Lambeth. Shadow Database is also part of constituting new technical and social components that surround CGRMC and @SaveCressingham. This performativity enacts an alternative technics and politics of urban regeneration. It is a performance that, to draw from Leslie Kern and Heather McLean's (2017, p.407) study of urban political economy, can point to *other kinds of urban worlds* that are expressed through resident aspirations for the self-management and community ownership of Cressingham as documented in The Peoples Plan (Cressingham Residents, 2016).

I recognise that the multiplicity of methods, intuitive exploration, and subjective nature of data that I produce through this project can be problematic. A method assemblage can struggle to support an evidence base that shifts public policy or can be held up in a court of law, even though activist practices have these kinds of demands. Further, I cannot claim academic impartiality because all aspects of my life are involved in this project. This is not to say that I reject the precision of analysis and data collection afforded by more conventional research methods − such approaches are vital, as evidenced by an academic report (Crawford et al., 2014) frequently referenced by activists that favourably compares refurbishment with demolition. Rather, I acknowledge the ambiguities of my research methods and data and argue that they counter a metrics-focused understanding of urban regeneration that will always fail to capture the socio-technical complexities and experiences of Cressingham residents.

Methods

This section describes the methods I employ in this project, including Almost Workshops informed by action research and participatory design practices; arts techniques such as defamiliarisation and dysfunction; building contraptions; writing code and prose; and creating annotations and diagrams. To draw from Law (2004, p.42), these methods involve processes of bundling, assembling, and crafting a set of relations. This is creative process in which I bring together different methods, practices, and components to decipher, figure, or intervene in the operation of HARMS. In doing so, I identify the societal and cultural implications of Lambeth's databases within the minutia of more-than-technical processes.

Almost Workshops, action research, participatory design

An Almost Workshop describes group activities I instigate or become involved with in which residents, activists, and others work with or think through information associated with HARMS. An Almost Workshop refers to activities that may feel like academic or artist-led workshops despite not necessarily being implemented as such. These activities include the creation of lists and docu-

ment archives in preparation for judicial review (The Regen Lookup_tables, chapter four), a workshop/performance on Cressingham exploring SOR codes (Paper Houses, chapter 5), service charge meetings in residents' homes (see Service Charge Parser, chapter five), and more formal committee meetings in which my role flips between organiser, resident, activist, and academic observer. The concept of an Almost Workshop and its enactment aims to decentre my role as an academic or artist by focusing on collaborative efforts. This decentring is informed by histories of action research (AR) and participatory design (PD) and invites critique of relationships between instigators and attendees, the institutions or organisations with which they are associated, and the technological implications of those relationships.

Traditions of AR shed light on the democratic and participatory implications of database technologies within processes of urban regeneration. The social psychologist Kurt Lewin is recognised by scholars (e.g., Masters, 1995) as having informed the basis of AR theories and practices in the US during the 1930s. Early concerns of AR include gains in productivity in industry and increased law and order through democratic participation (Adelman, 1993, p.7). Notably, Lewin's work shaped the formation of the UK's Tavistock Institute in the 1940s, where researchers embedded themselves in workplaces to explore how workers responded to changing technologies (Neumann, 2005, p.1).

Trist and Bamforth's (1951) seminal study of longwall coal mining, originating from the UK's Tavistock Institute, illustrates how early AR projects engage with the central concerns of this research project. Such projects challenged the scientific dogma of Taylorism that focused on labour productivity at the expense of the worker by addressing relations between technology, the organisation of work, and its psychological impact. Peter Asaro (2000, p.265) − the historian of science, technology, and media − highlights how these British AR projects were shaped by theories of psychology and biology that resulted in particular outcomes. This theoretical framing revealed inefficiency as a product of optimising technical components at the expense of human components. These British researchers devised the concept of *autonomous work groups* (Mumford, 1987) through which workers could develop their own work routines with little or no supervision as a way to improve health and well-being in the workplace. With this in mind, it has been useful (at times) to consider Cressingham residents and activists as unpaid workers within HARMS who perform the labour of reporting, monitoring, and contesting repairs − a stressful task made easier through relaxed meetings (Almost Workshops) in people's homes, often with cake, in which residents think and work through strategies for coping with Lambeth's housing systems.

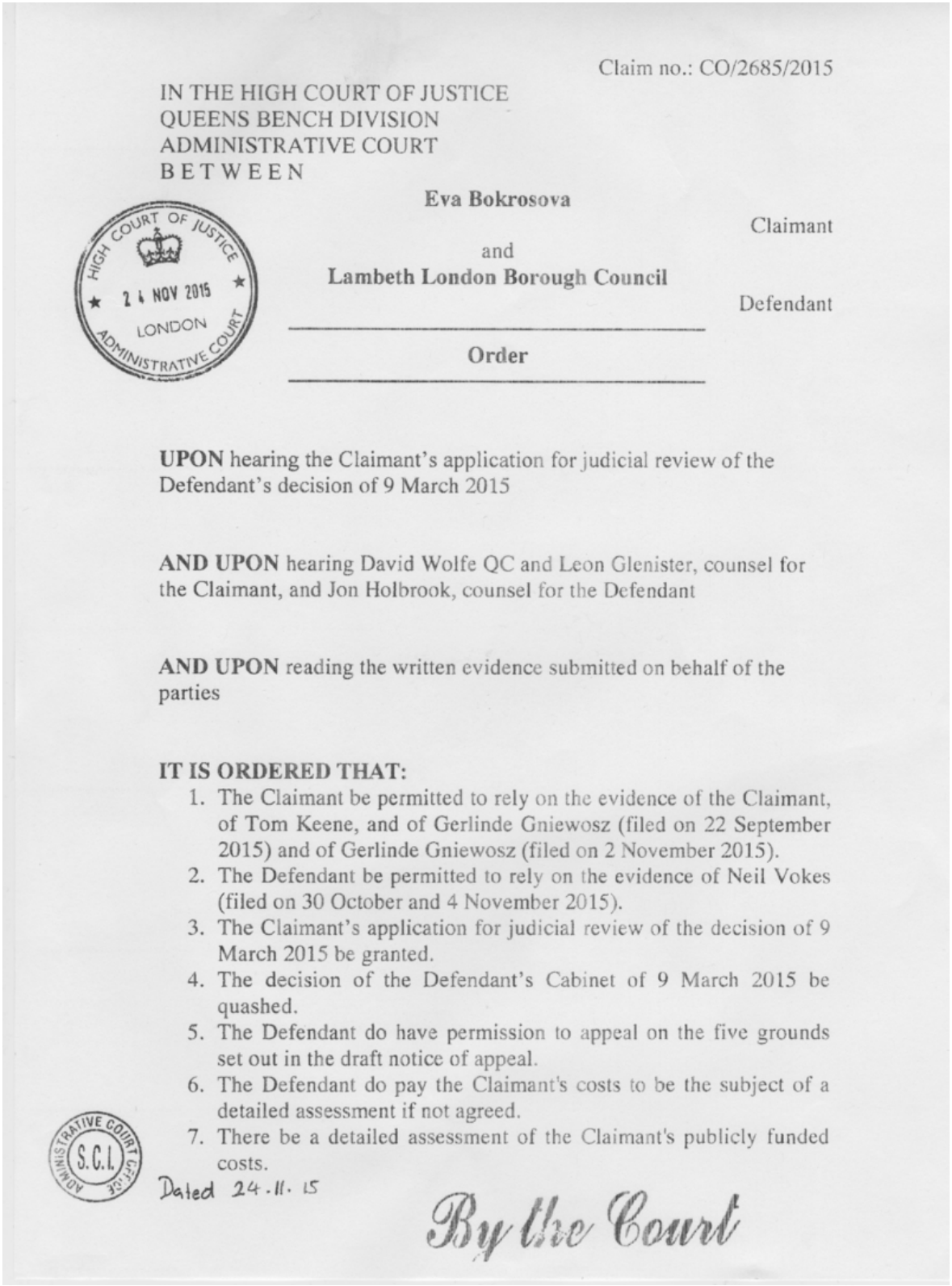
PD is recognised as an approach to include workers in design processes (Ehn, 2008), to envisage use before actual use, and consider how technology alters work practices (Redström, 2008; Asaro, 2000, p.288). Asaro (ibid, 265) describes the early Scandinavian *collective resources* approach involving research projects in which computer scientists worked with the Norwegian Iron and Metal Workers Union to develop computer systems. These projects were informed by Marxist critique and

aimed to assist the Trade Union in collective bargaining with management. This critique brought focus on democratic reform of the workplace through union (rather than individual) empowerment through technological systems − even going so far as to suggest that workers should not collect information as this might open opportunities for management to exploit workers. Crucially, these early Scandinavian projects argued that the British approach to participation was fundamentally capitalist because it increased productivity and decreased worker resistance (ibid,268). Asaro's discussion of PD, therefore, identifies how different participatory techniques and theoretical positions can bring about and enact particular goals, outcomes, and kinds of politics. These are important consideration for this project.

The anthropologist Christopher Kelty (2016) observes that participation can flip between forms of ethical concern, co-option, or a mode of liberation from hierarchy and control. Participatory practices, for example, can drive efficiency, instigate democratic reform, promote workers interests, reintroduce skills, reconfigure management structures, and improve mental health. Participatory practices involving communications technologies can also subjugate and exploit through increased automation of the workplace, deskilling of workers, and new forms of monitoring. These contradictions of participation are well-recognised within practices of urban design (e.g., Dicks, 2014) and by Cressingham residents (see fig. 25.).

It is notable, therefore, that Lambeth (2014) declare themselves a *co-operative council* (see fig. 65., 2012) which invokes the ideas of the Rochdale Pioneers of 1844 who instigated the co-operative movement, that are bound with ideas of democratic process, workers' rights, and resident empowerment that predate the interventionist state and the working class right to vote (Holyoake, 1893; Fairbairn, 1994). However, the reality for residents is a lack of control over decision-making and difficulties accessing information. Residents, after all, are not legally defined workers or Lambeth co-operative members. Lambeth's now-rescinded promise that "no decision would be taken without the support of residents" indicates a current mode of participation that seeks to control outcomes. It is important to underline, therefore, that these wider concerns of participation add to my conceptual framing of HARMS by exposing it as a site of democratic contestation and political opportunism.

Almost Workshops with Cressingham residents and others integrate PD concerns of individual empowerment and collective action. Paul Lichterman's (1998, p.404) analysis of social activism resonates with the intent behind Almost Workshops when he states that social movements act as a workshop of democracy. As such, Almost Workshops are a method of crafting social (e.g., informal meetings, ad-hoc events) and technical components (e.g., email lists, phones, archives of documents, a repairs database) to bring about changes in Lambeth's systems of repair. As a research method, they produce data about how residents feel about the technical systems they engage with and are also a space to think and work through the democratic implications of HARMS in a way that values residents' time and labour.



Claim no.: CO/2685/2015

IN THE HIGH COURT OF JUSTICE
QUEENS BENCH DIVISION
ADMINISTRATIVE COURT
BETWEEN

Eva Bokrosova

Claimant

and

Lambeth London Borough Council

Defendant

HIGH COURT OF JUSTICE 24 NOV 2015 LONDON ADMINISTRATIVE COURT

Order

UPON hearing the Claimant's application for judicial review of the Defendant's decision of 9 March 2015

AND UPON hearing David Wolfe QC and Leon Glenister, counsel for the Claimant, and Jon Holbrook, counsel for the Defendant

AND UPON reading the written evidence submitted on behalf of the parties

IT IS ORDERED THAT:

1. The Claimant be permitted to rely on the evidence of the Claimant, of Tom Keene, and of Gerlinde Gniewosz (filed on 22 September 2015) and of Gerlinde Gniewosz (filed on 2 November 2015).
2. The Defendant be permitted to rely on the evidence of Neil Vokes (filed on 30 October and 4 November 2015).
3. The Claimant's application for judicial review of the decision of 9 March 2015 be granted.
4. The decision of the Defendant's Cabinet of 9 March 2015 be quashed.
5. The Defendant do have permission to appeal on the five grounds set out in the draft notice of appeal.
6. The Defendant do pay the Claimant's costs to be the subject of a detailed assessment if not agreed.
7. There be a detailed assessment of the Claimant's publicly funded costs.

ADMINISTRATIVE COURT OFFICE S.C.I.

Dated 24.11.15

By the Court

Figure 27. *Result of the 2015 Judicial review.*

Arts practice: from defamiliarisation to contraptions

Art techniques of defamiliarisation, dysfunction, amateur making, engineering, and humour help me recognise aspects of database systems and urban regeneration to which I am otherwise blind.[3] For example, the socially engaged artists and researchers Alexandra Jønsson and Cliff Hammett use humour to explore what happens when smooth interactions with a mobile phone are disrupted within their *Conductive Glove* project − which adds metal extensions to the fingers of a dishwashing glove to explore how mobile devices mediate social and bodily relations (see fig. 28.). Julian Oliver's critical engineering and computational art project *HARVEST* (2017) explores the environmental impact of Bitcoin by mining this cryptocurrency with wind to fund climate research. Samantha Penn's (2019) enquiry into the washing machine explores the gender implications of a device that transforms human gesture into a computational machine. Such techniques provide a space for critical reflection on intimate relationships between the body, everyday work/life practices, electrical components and devices, computer networks, and the situations they mediate − these are all important considerations in my exploration of HARMS.

The artist duo YoHa (2019) describe a contraption as a machine or device that appears strange, unnecessarily complicated, and often badly made or unsafe. For YoHa (Harwood, 2013, p.20), a contraption is a method contained in the simple act of making, looking, and working with a technical collective such as a database system with human, material and abstract components. Notably, the instability of a contraption ensures that its field of relations are made visible which emphasises the forces at play that cause a technical collective to break. This emphasis, I argue, sheds light on human actions, aspirations, and desires to improve a technical object. Crucially, this mode of analysis draws on Simondon's (2016, p.xvi) conceptualisation of humans as coupling devices between machines. The technicity of the machine, therefore, mediates human aspirations to fix it, reorganise it, or make it more efficient. As such, building contraptions on Cressingham involves paying close attention to where aspirations to improve a contraption arise from.

YoHa's' *Invisible Airs* project (fig. 29.) provides an example of a contraption that operates as an enquiry into the expenditure database of Bristol City Council. The project identifies the boredom associated with council data as a form of power that impacts democratic engagement. YoHa plays with idea of a funfair ride to counteract this boredom by creating a pneumatic contraption controlled by council data. Their playful contraption points to relations between power, governance, humans, and data structures. In a similar manner, contraptions within this project are places of experimentation and fun that create a relaxed atmosphere, build trust, and underline the intra-personal implications of technologies. More than this, as Harwood (2013, p.37) states, a contraption operates as something like a physical diagram of a technical collective. Notably, Harwood's statement con-

3 The soviet literary theorist Victor Shklovsky (1917) coined the term defamiliarisation to describe a means of perceiving an object or event as if it were happening for the first time. This method, therefore, can draw attention to the intricacies of everyday practices such as reading a service charge bill.

nects with Foucault's (1995, p.171) descriptions of the military camp, and also the construction of a working-class housing estate, as physical diagrams of power, a concept I explore through chapter six in my analysis of the Shadow Database, Regen Calculator, and SPV bike trailer. Accordingly, making contraptions and other technical objects on Cressingham creates a platform for observing power relations as they take form.

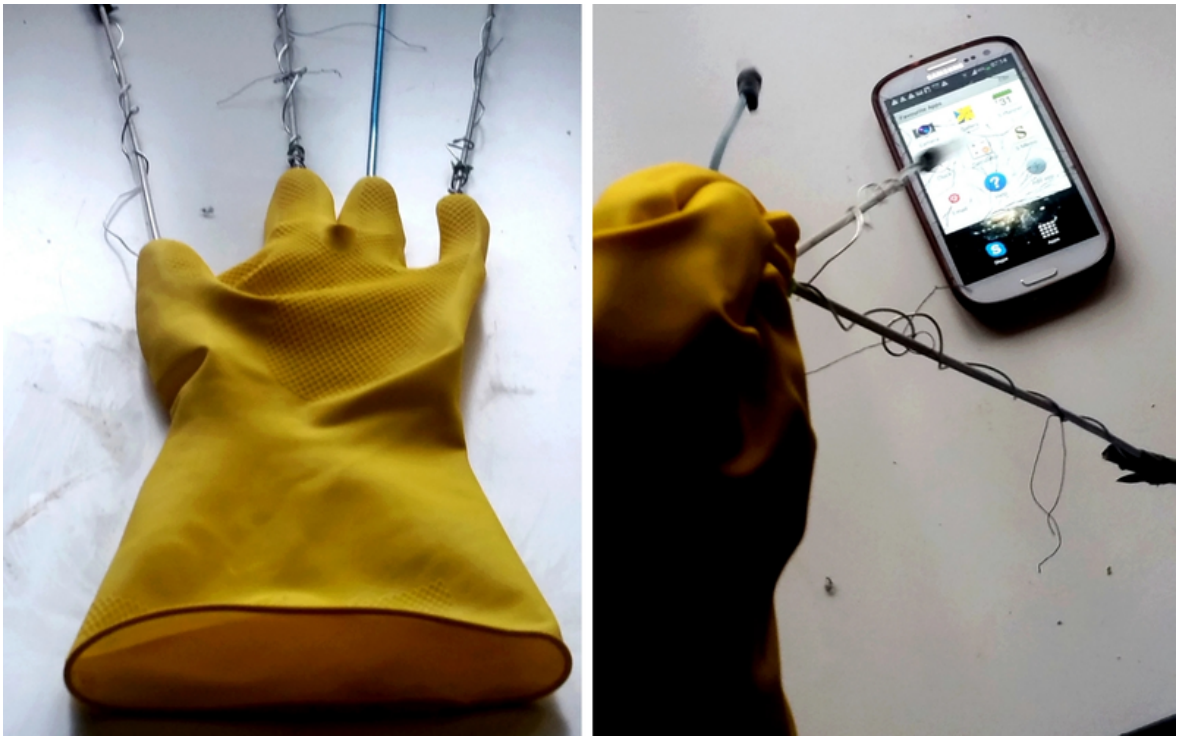


Figure 28. *Jønsson and Hammett's conductive glove project. Image: Jønsson*

Figure 29. *Invisible Airs: Pneumatic chair controlled by council expenditure data. A ride for Bristol City Council. Image: YoHa*

The artist group Critical Art Ensemble (CAE) propose that tactical media practitioners can be cultural hybrids comprised of any combination of artist, activist, designer, or researcher − an approach

that resonates with Laws concept of method assemblage. David Garcia, professor of Digital Arts and Media Activism at Bournemouth University in the UK, was instrumental in defining tactical media as a wider trend of politically and technically engaged artists such as CAE and Bunting (Garcia and Geert, 1997). This approach invites quick and playful exploration and supports an enquiry that is led by intuition that can expose relations between government, citizens, and technologies. This method of working can employ any form of media or production technique and is not constrained by the boundaries of a single discipline. However, it takes confidence to inhabit this interstitial space because each disciplinary domain can struggle to recognise aspects of this work within their own confines. Much of the arts world, for example, may not recognise these works as art and academics may dismiss the validity of research that lacks more formal qualitative and quantitative methods.

A rapid turn-over of technique and my use of fiction is important in this project. From posting amusing images on social media (see fig. 113.), to my use of the term HARMS, or my one-use invention of "The Council" (a fictional organisation) to attend a commercial housing conference (see fig. 30.). These and other techniques supported activist efforts, generated amusemented amongst @SaveCressingham campaigners, and provided access to an alien world of housing management and its acronyms. These techniques are informed by tactical media practitioners the *Yes Men* who have spoofed websites and attended events under a pseudonym to expose the dehumanising ways that corporations and government organisations act towards the public. The Yes Men are known for quickly responding to opportunities as they arise and working with publicity and humour. Their work introduces a sensibility that balances the urgent requirements of an activist campaign with personal and academic commitments. This sensibility raises important questions concerning residents' abilities to participate in democratic processes on Cressingham.

Arts practice might seem indulgent within the midst of an activist campaign but it can slow down and draw attention to processes that might otherwise be overlooked. Arts techniques counter a technical mindset that seeks a solution to a predefined problem. However, it is important to critique arts practice in the context of regeneration. *Artwashing* (Pritchard, 2017; Sheldon, 2015) is a term that calls attention to how artists work can smooth over ethical concerns about urban regeneration. Examples include murals on buildings or billboards commissioned by developers or councils to impart a false sense of community approval to planning proposals. Artwashing also includes artist-run workshops that can hold more value for an artist's career or for commissioning institutions than for the resident-subjects of that work. Being led by the social issue rather than the art practice, as illustrated by the work of the Yes Men, goes some way to address such concerns. The arts techniques that I employ in this project, therefore, do not simply represent issues of urban regeneration, nor do they focus on an aesthetic for activist marches, protest, or gain media attention as explored in the book Beautiful Trouble (Boyd and Mitchell, 2013). Rather, they attempt to *do something* by helping to comprehend, engage with, and have fun as residents fight against a tsunami of ineffectual repairs and planning consultations that contribute to the demolition of homes.

Figure 30. *Name badge with a fake job title and organisation. Used to gain access to a commercial housing conference.*

Programming and other modes of writing

In this project, I use a distribution of the *GNU/Linux* computer operating system (OS) called Arch Linux (www.archlinux.org) for all my computer-based work including: writing text and code; creating images and diagrams; editing audio and video; and browsing the web. GNU/Linux is a Unix-like OS built around the GNU General Public License (GPL) that gives users permission to access, modify, and share code without monetary cost.[4] GNU/Linux contrasts proprietary OSs that restrict access and permission to use underlying code such as *Microsoft Windows* (which Lambeth primarily works with) or *Mac OS*. There are many distributions (versions) of GNU/Linux with names like Arch Linux, Ubuntu, or Red Hat. The GNU/Linux project is noteworthy for its emphasis on the politics of freedom and its support by the Free Software Foundation. This emphasis is important to this study because it draws attention to how software and hardware mediates the ways in which HARMS controls and shares information about Cressingham.

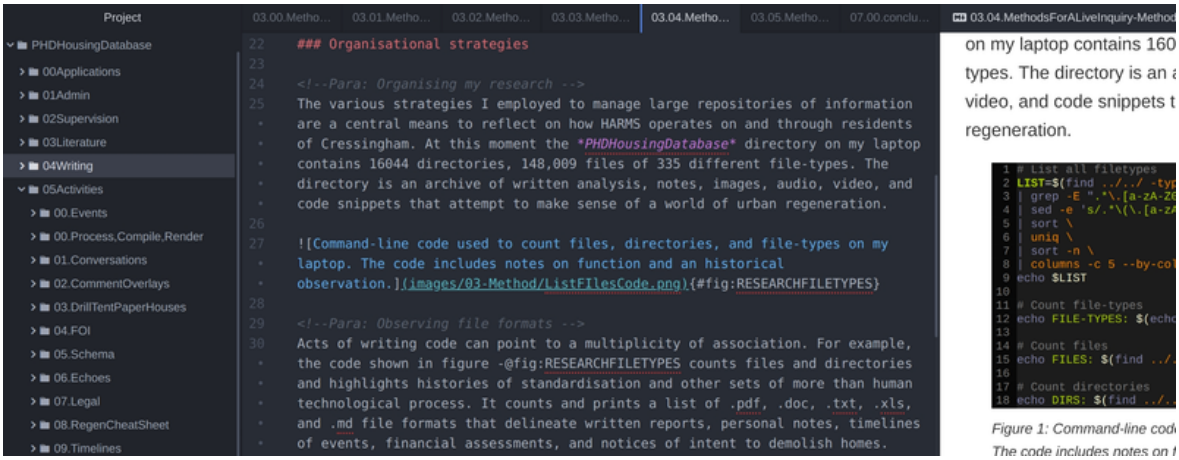


Figure 31. *GUI used to write code and prose for this project. The left section shows the directory structure, the middle is the writing area, and the right shows a preview of formatted text and image.*

GNU/Linux is recognised (e.g, Sweeny, 2015, p.122; Medosch, 2016, p.374) as an important route to a digital commons and tends to be used by the artists that I draw from in this project such as Yoha. GNU/Linux, therefore, is constant with PD methods because it draws attention to tensions between technology, participation, and forms of control. The artist and media researcher Aymeric Mansoux (2017) articulates the way in which GNU/Linux is a site of tension between different technical and philosophical positions. The free software pioneer Richard Stallman (2020) outlines some of these positions when he describes "free" software as a matter of freedom rather than price because it makes users free to run, study, change, and redistribute copies of software. Stallman argues, therefore, that *open-source* software is distinct from *free* software because of its focus on practical concerns, such as better security and functionality, rather than any principled position. My use of the GNU/Linux

4 Unix is an OS released in 1971 that nearly all contemporary operating systems can trace their heritage back to including GNU/Linux, Mac OS, Android, iOS, Chrome OS, and those embedded in televisions, and other devices. Unix is thus integral to the technicity of contemporary OSs and the database systems they underpin.

OS Arch Linux, therefore, aims to make more visible the associations between principles, software developers, licence agreements, and the specifics of software and hardware in Lambeth.

Figure 32. *Garnet Hertz's art project − The Process of Writing an Academic Monograph. Image: Noel Rubin. Published with permission of the artist.*

My work in this project requires a mindset that easily switches between theoretical, technical, and activist modes of thought. To this end, I work with the FLOSS software titled *Atom Editor* (henceforth Atom) to write programming code, the prose of this thesis, and contributions to activist and other texts.[5] Atom's GUI (see fig. 31.) breaks down boundaries between technical work, academic, and activist endeavours. The GUI supports the reflexive interrogation of writing and publishing tools while working with code and data. This writing method resonates with Hertz's critical making project *The Process of Writing an Academic Monograph* (see fig. 32.) that defamiliarisess, deconstructs, and amplifies aspects of writing as a more-than-technical act. Working with Atom, therefore, brings code, theoretical, and narrative modes of writing into close proximity, which facilitates cross-disciplinary work methods.

5 *Atom* is a FLOSS text and source code editor. Atom is developed by a company called GitHub that was recently acquired by Microsoft who create the propitiatory Windows OS. GitHub provides free hosting and other services for a software version control system called Git that is extensively used by FLOSS communities. Atom, therefore, sits at an intersection of FLOSS and propriety software industries and so provides additional layers of reflection within this project.

```
# List all filetypes                          #
LIST=$(find ../../ -type f \                  #  In the late 1950s the term
| grep -E ".*\.[a-zA-Z0-9]*$" \               #  'folder' was introduced to
| sed -e 's/.*\(\.[a-zA-Z0-9]*\)$/\1/' \      #  computing as a means to
| sort \                                      #  describe the hierarchical
| uniq \                                      #  system employed in the design
| sort -n \                                   #  of ERMA (Electronic Machine,
| columns -c 5 --by-colum)                    #  Accounting) Mark 1.
echo $LIST                                    #
                                              #  'The Directory' was a body of
# Count file-types                            #  of five directors forming the
echo FILE-TYPES: $(echo $LIST |  wc -w)       #  executive power of France
                                              #  from 1795 to 1799.
# Count files                                 #
echo FILES: $(find ../../ | wc -l)            #  1540s, a book of rules or
                                              #  directions, especially
# Count folders (directories)                 #  ecclesiastical.
echo DIRS: $(find ../../  -type d | wc -l)    #
```

Figure 33. *Command-line code used to count files, directories, and file-types on my laptop. Comments in the code (in-situ annotation) describe histories of the term directory that connect with ideas of knowledge, power and control.*

I write programming scripts with Python, Perl, Golang, JavaScript and other computer languages to support playful open-ended research and activist activities. To draw from Goffey (2008), I also employ software engineering as a form of cultural analysis. These scripts do anything from merging data-sets obtained via FOIA requests to parsing lists of cabinet decisions and documents published on Lambeth's www.lambeth.gov.uk website since 1999, or counting the 16,044 directories, 148,009 files, and 335 different file formats I have amassed (at the time of writing this chapter) within this project since 2012 (see fig. 33.). These scripts are used to think through, manage, and comprehend the scale of the information that is generated through my engagement with HARMS. They help to interrogate histories of decision-making and metrics published by Lambeth in an attempt to reverse engineer how they have been calculated. Writing code, therefore, both interrogates and operates as a document of what HARMS does.

Relational mindset, diagrams, and annotation

YoHa (2013) inform a mindset and method in this project that explores technical objects through the close proximity between text, objects, ideas, and materiality. YoHa illustrates this practice through their *Evil Media Distribution Centre* installation (see fig. 34.) which was displayed at the 2013 Transmediale festival in Berlin. The installation was an artistic response to Fuller and Goffey's book Evil Media (2012) that expands the understanding of what media or forms of mediation are and invites a deeper understanding of their effects. YoHa invited sixty artists (including myself), technologists, theorists, and others to select a so-called *grey media object* and contribute a short text to the installation. The objects ranged from tampons to software compilers, to HTML Forms, and an ISO (International Organization for Standardization) shipping container corner. Here, theory and practice operate as an interconnected whole: where I work with spreadsheets, timelines, or primary keys and then turn to concepts of technicity or power/knowledge, for example, to explain how they organise labour and set limits on what can be known or acted on.

Roomba

Author: Tom Keene

Date of origin: Introduced in 2002.

Manufacturer: iRobot

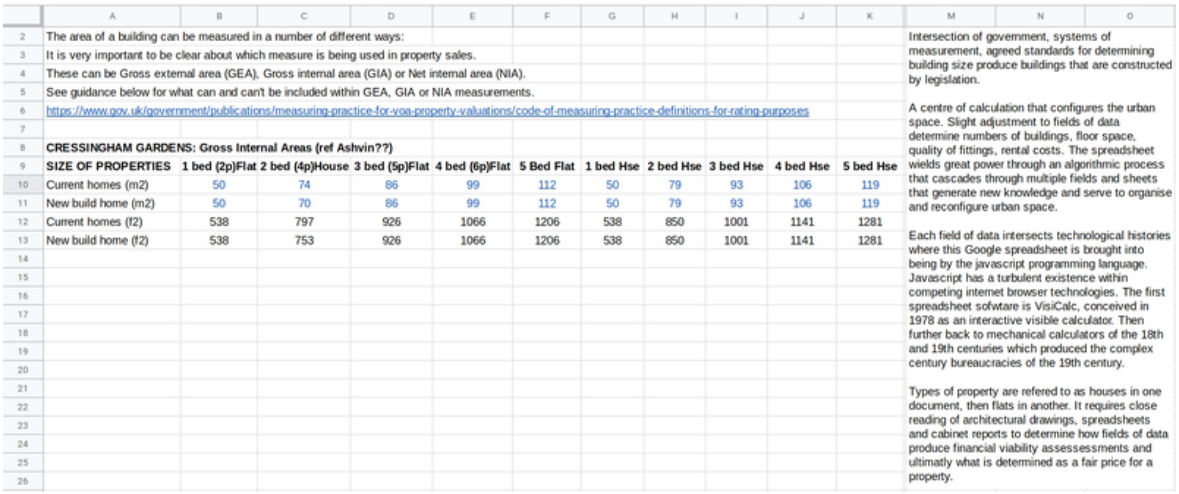
A 13" diameter, 3.5" high, autonomous vacuum cleaner equipped with sensors that detect obstacles, dirt, recharging points, airflow, malfunction and impassable staircases. A central processing unit controls power to fans, brushes, an audio speaker, motors, and wheels. It employs an algorithmic cleaning pattern that spirals, follows walls and randomly selects direction. If a Roomba gets stuck, humans are instructed to "Lift and move Roomba to a new location" by a firm yet comforting female robot voice. Designed to fight dirt and grime, they are built by iRobot, one of the largest manufacturers of military robotics in the US.

Figure 34. *Installation of the Evil Media Distribution Centre at Transmediale. Combined with a text contributed by this author. Top Image: YoHa*

The diagrams I create in this project sit at the intersection of art objects, research devices, and activist strategies. They map entanglements of database technologies that I cannot always articulate through text. The artist Heath Bunting's *Status* (2014) project is influential here because his diagrams map the machinery of government and the ways it classifies and manages humans. *Share Lab's* (2016) impressively detailed *Facebook Algorithmic Factory* is another influence with diagrams that map the inaccessible technical systems of the social media site Facebook. Bunting and Share Lab's diagrams operate as documentation of systems of technical governance as part of strategies to intervene in their operation and so resonate with the activist work in this project. However, the highly polished technical aesthetic that Share Lab employs is somewhat problematic because it imparts a false sense of precision − as Share Lab (Debaty, 2017) acknowledge, they have limited capacity to understand and investigate Facebook because of its inaccessibility. Hence, in diagraming HARMS I use an ambiguous aesthetic that I derive from Bunting because it exposes the limitations of a diagram through an association with a rough plan or art object (see 39.).

My use of *in-situ* annotation maintains a connection between technical objects and the observa-

tions made while working with them and with residents. Examples in this project include pencil comments over cabinet reports (fig. 36.), comments in programming code (fig. 33.), labels within diagrams, and notes in the margins of spreadsheets (fig. 35.). Bill Gaver's and John Bowers (2012, p.4) 2012, 4) annotated portfolios resonate here in their use of annotation to present the multidimensionality of design work. Likewise, the statistician Edward Tufte's (1983) seminal book *The Visual Display of Quantitative Information* uses wide margins to incorporate diagrams and text as a form of annotation that communicate complex sets of associations. However, as with Share Lab's diagrams, the formalised designs employed by Gaver, Bower and Tufte can exclude the messy realities of research that are better communicated by an unfinished aesthetic. For this reason, the annotations in this project aim to connect with the often messy and *ad hoc* nature of their initial production.



	A	B	C	D	E	F	G	H	I	J	K
2	The area of a building can be measured in a number of different ways:										
3	It is very important to be clear about which measure is being used in property sales.										
4	These can be Gross external area (GEA), Gross internal area (GIA) or Net internal area (NIA).										
5	See guidance below for what can and can't be included within GEA, GIA or NIA measurements.										
6	https://www.gov.uk/government/publications/measuring-practice-for-voa-property-valuations/code-of-measuring-practice-definitions-for-rating-purposes										
7											
8	**CRESSINGHAM GARDENS: Gross Internal Areas (ref Ashvin??)**										
9	**SIZE OF PROPERTIES**	**1 bed (2p)Flat**	**2 bed (4p)House**	**3 bed (5p)Flat**	**4 bed (6p)Flat**	**5 Bed Flat**	**1 bed Hse**	**2 bed Hse**	**3 bed Hse**	**4 bed Hse**	**5 bed Hse**
10	Current homes (m2)	50	74	86	99	112	50	79	93	106	119
11	New build home (m2)	50	70	86	99	112	50	79	93	106	119
12	Current homes (f2)	538	797	926	1066	1206	538	850	1001	1141	1281
13	New build home (f2)	538	753	926	1066	1206	538	850	1001	1141	1281

Intersection of government, systems of measurement, agreed standards for determining building size produce buildings that are constructed by legislation.

A centre of calculation that configures the urban space. Slight adjustment to fields of data determine numbers of buildings, floor space, quality of fittings, rental costs. The spreadsheet wields great power through an algorithmic process that cascades through multiple fields and sheets that generate new knowledge and serve to organise and reconfigure urban space.

Each field of data intersects technological histories where this Google spreadsheet is brought into being by the javascript programming language. Javascript has a turbulent existence within competing internet browser technologies. The first spreadsheet sofwtare is VisiCalc, conceived in 1978 as an interactive visible calculator. Then further back to mechanical calculators of the 18th and 19th centuries which produced the complex century bureaucracies of the 19th century.

Types of property are refered to as houses in one document, then flats in another. It requires close reading of architectural drawings, spreadsheets and cabinet reports to determine how fields of data produce financial viability assessessments and ultimatly what is determined as a fair price for a property.

Figure 35. *An annotated spreadsheet. Compares the size of Lambeth's proposed new-build against existing properties. The annotation to the right describes intersections of governance, measurement, and standardisation.*

My documentation website www.db-estate.co.uk operates somewhere between an artist's sketchbook, archive, designers portfolio, technical test space, activist resource, and diagram of my engagement with HARMS. The website is a method of exploring tensions between publishing technologies and my role as a researcher and activist. These tensions included the pressure to quickly publish information that does not feel polished enough for inclusion within an academic article though, as with the *Regen Cheat Sheet* (see fig. 37.), provided important and timely information for housing activists who sought help from me at the time. The creation of the website was also a technical process through which I wrote code to automatically generate its HTML pages then publish them to the web. The website does not involve a database and thus draws attention to my thought process as a programmer where I found myself desiring the functionality that a relational database can provide. The website, therefore, is a method of thinking and acting through technical, interpersonal, institutional, and activist associations that are apparent in this project.

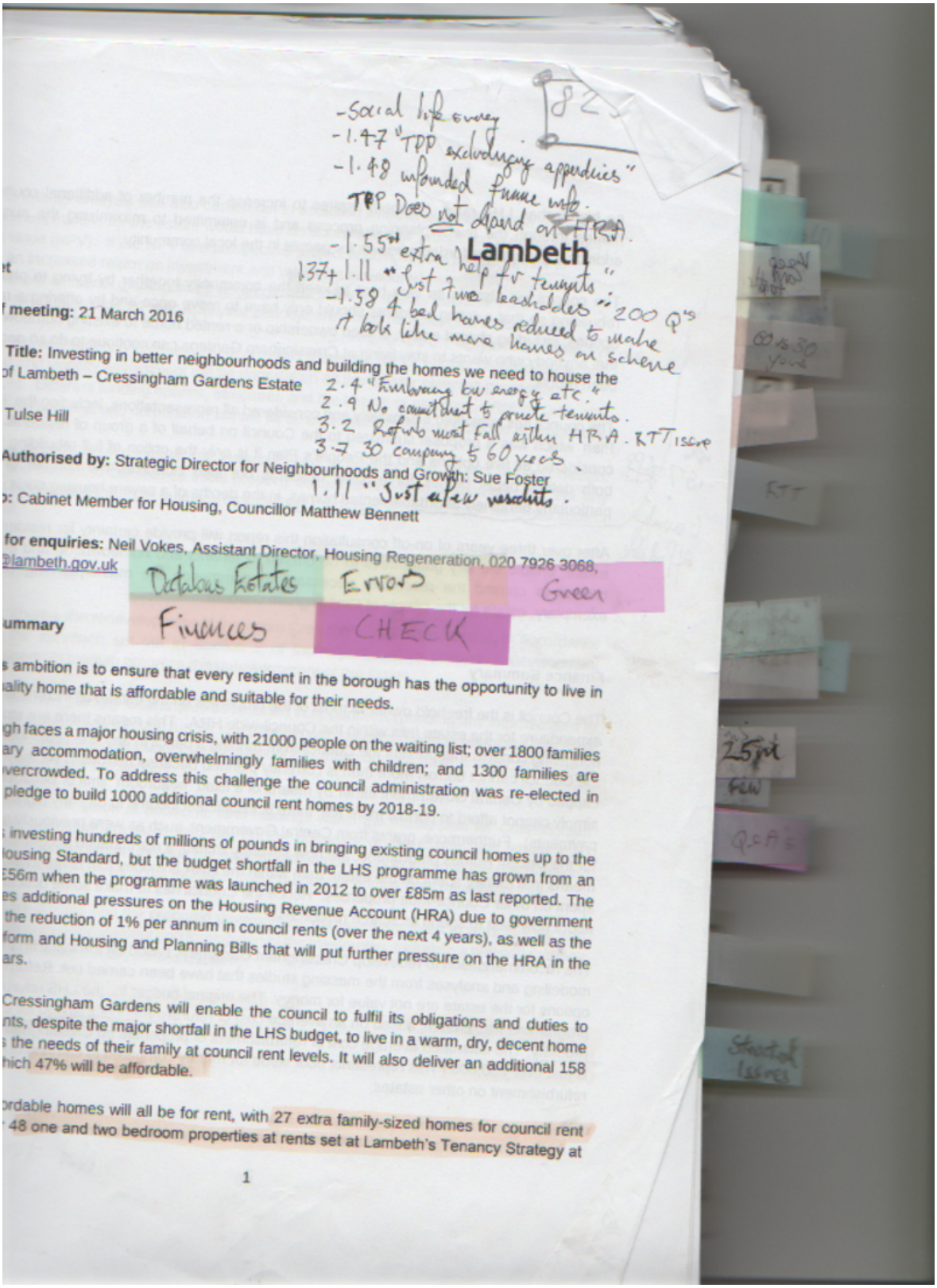


Figure 36. *Annotation of a Lambeth cabinet report.*

THE REGEN CHEAT SHEET

PRE-PLAN CONSULTATION
Council officers consult through:
- Tenants and Residents association
- Resident engagement
- Ward councillors
- Workshops
- Specialist advisors
- Massing plans
- Key Guarantees
- Equalities impact
- Financial viability
- Test of opinion
- Housing needs survey

CHALLENGE TO CABINET
Scrutiny committee
Judicial review

DECANT, MOVE, DISPLACE
Tenant demolition notices
Homeowner buyback
Compulsary purchase
Move residents

RESIDENT RESPONSE
Attendance at events
Email, letter, phone
Petition, Demonstration
Paper, TV, Social media,
Freedom of information requests
Alternative 'peoples' plan

CABINET REPORT & DECISION
Council offers write report
Officers recommend demolition
Cabinet vote to accept the report
Money allocated from HRA or GA

DESIGN & PLANNING
Master planning
Resident 'input'
Topographical/services surveys
Affordable housing targets
Detailed design and budget
Planning application & decision

PRE/DURING/POST CONSULTATION
Occupancy:
- Tenants: Secure & temporary
- Homeowner: Leasehold/Freehold
- Private renters (not recognised)
- Housing waiting lists
- Property lists
- Complaints

Finance:
- General Fund (GF)
- Housing Revenue Account (HRA)
- Grant and borrowing income
- Rent & Service Charge income
- Major works collection
- Right to buy income

Repairs & Maintenance:
- Responsive repairs
- Major works (S20 notices)
- Grounds maintenance
- Insurance claims
- Decent homes surveys
- Structural surveys

Legislation:
- National planning framework
- London plan
- Local plan

COPING WITH REGENERATION

When faced with regeneration the sheer scale of what you may have to deal with is daunting. The following text is intended as a quick guide to what you need to think about. It covers technical information, expertise, legal processes, and general practicalities for coping with your local authority.

EXPERTISE

A broad variety of skills are required to deal with regeneration. Going through the process equips you with many of these skills, but there is nothing like accessing expert knowledge, so don't be afraid to approach people. You'll be surprised how many people are happy to lend their expertise to a good cause. For the @savecressingham campaign we were lucky to assemble the following from the local area and beyond:

- **People respected in the community:** You need well-liked individuals who people can easily relate to and speak with. This is important as residents need to act as a group.
- **Financial:** Someone who can understand the complexities of local authority accounting, including financial viability assessments.
- **Legal:** The legal system is confusing, so find someone to help navigate it.
- **Surveyor:** A local resident (quantity surveyor) helped us contest Lambeth's estimates for refurbishment.
- **Architect:** A firm or individual able to creatively think of alternatives and/or contest local authority proposals.
- **Tenants and Homeowners:** Each group has access to different kinds of knowledge.
- **Information Technology:** Find someone who can create a website on WordPress or similar technology that lots of people know how to use so you are not solely dependent on them.
  Data: Someone who can work with data is very important. They need to understand how data is structured so that your campaign can ask searching questions of data sets held by a local authority.
  Journalist/writer: Any help with getting information into local and wider media is a massive help.
- **Social media:** If you don't already, connect with others facing the same issues ASAP. On Twitter these accounts are a good start: @savecressingham, @DemolitionsLdn @southwarknotes, @archiworkers, @savecentralhill, @35percent.

GOVERNANCE

It takes time to decipher how a Local Authority makes its decisions, and council constitutions do differ. So try and get advice or support from the local area. Broadly speaking (in Lambeth):

- **A council cabinet** is made up of senior elected councillors and holds meetings to vote on decisions (though decisions are frequently agreed well before a cabinet meeting).
- **Council officers** (employees) produce reports which are presented to the cabinet.
- **Ward councillors and local MPs** are supposed to represent residents views to the council, though they often set party-political matters over representing their constituents, especially given that the three main political parties - Labour, Conservatives and Liberal Democrats - all use a "whipping" system: That is, councillors are coerced through party loyalty to vote as the cabinet desires and not as their conscience dictates.
- **The cabinet** votes on the recommendations (i.e. to demolish an estate or not) contained in the reports they receive from officers who are influenced by the aspirations and directions of cabinet members.
- **Residents and other interested parties** can apply to speak for a short time at the meetings through speaking time will not necessarily be granted and decisions are likely to have already been made behind closed doors.
- **Ward councillors** from any political party can submit questions to a scrutiny committee. The scrutiny committee has the power to send a decision back to the cabinet for review, with

JUDICIAL REVIEW

A judicial review (JR) can be instigated within 3 months of the original cabinet decision. The JR can quash or nullify the decision. Council officers have a statutory obligation to consult with residents directly affected by regeneration and to follow due process. For example, if officers misrepresent the consultation to the cabinet by not presenting key information or proposing action that goes against the council's written constitution or legislative guidelines then that can be grounds for a JR. Furthermore, if the information is presented to consultees deviates from the structure of the consultation as set out by the council then that is also grounds for JR.

RIGHT TO MANAGE (RTM) / RIGHT TO TRANSFER (RTT)

Cressingham Gardens residents exercised both these rights before any decision was made to demolish. These rights are aimed at assigning direct control over maintenance, repair, and other services. Both RTM and RTT ensure that tenants have an independently managed vote on the future management of an estate. This kind of vote, arguably, expresses residents' views more clearly and directly than council consultation reports which often use methods that leave resident opinion open to misrepresentation such as multiple choice answers to questions, rather than written answers. However, there are valid concerns over the RTT because it causes a change to tenants rights so legal advice should be sought to explain these changes. Cressingham residents applied to enact the RTT because this was the only way to prevent Lambeth from demolishing their homes.

DATA & CONSULTATION

Don't trust **ANY** data/statement provided by a local authority or a developer (if different) within a consultation process. Double-check it data by requesting all sources that enabled a particular calculation or statement. And keep in mind that there is no such thing as 'raw data' as it's always been pre-cooked, so review how information has been amassed. As an example:

- **Ward councillors and council officers** informed some Cressingham Gardens residents that the estate was "sliding down the hill" and had major structural issues. This statement proved to be incorrect because we requested all estate surveys and none indicated major structural issues.
- **High repair and maintenance costs** are sometimes cited as the catalyst for demolition when analysis of the actual costs can reveal a different picture. Homeowners may have more access to repairs data than tenants so work with homeowners to go through all historic service charge bills and double-check repairs have been completed, are done to a high standard, or have been reasonably charged.
- **Cressingham residents** contested £127,000 worth of repairs over a two year period which helped undermine Lambeth's claim that the estate was too expensive to repair.
- **Every citizen** has a right to audit local authority accounts once a year. It provides another means of accessing data. See: www.thepeoplesaudit.info
- **On Cressingham**, with the help of architects and a quantity surveyor residents put together a costed alternative plan to demolition. Do download the .pdf and steal ideas!: www.cressinghampeoplesplan.org.uk
- **Be aware** that consultations, even when facilitated by supposedly-independent advisors hired by your local authority, often aim for a predetermined result.

COMMUNITY ORGANISATION

Local authorities often attempt to divide secure tenants, temporary tenants, homeowners, private renters, and non-resident homeowners into separate groups to convince residents to buy into particular narratives. So get organised and!:

- **For the @savecressingham campaign** we found that a model of 'collective anarchy' worked best as a way to organise our group. This non-structure allowed us to collaborate but also meant that there was no leader for Lambeth to bribe or pick on. **This made us resilient** to a local authority that was aggressively repressive of resident dissent.
  Avoid splits between categories of resident as each group is able to offer valuable insights and local authorities have a history of using "divide and conquer" tactics to progress tricky regeneration projects.
  Request the same information is sent to all residents to avoid misinformation or misrepresentations being sent to different groups. Always follow up on this, and cross-check the information. It takes a few minutes, and can sometimes turn up errors and deliberate omissions.
  Notify residents in the area surrounding a regeneration estate of any development, as it's a chance to bring in expertise and support. Also, adjacent streets could well become part of a regeneration, or suffer from years of construction traffic and pollution. Local businesses may also be affected, as regeneration often means gentrification too, and shops serving local needs will lose part of their customer base.
  Build a strong Residents Association ASAP, and make sure it doesn't get hijacked by individuals who are in the pocket of the Local Authority - i.e. devise a plan for isolating someone who goes rogue (and there WILL be at least one over the course of any regeneration, often someone who has made a side-deal with the authority) as you don't have a Human Resources department to deal with such issues.
  Create a Facebook page and Twitter account. We suggest naming the campaign @SaveNAMEofYOURestate as lots of housing campaigns now use that naming system. It makes it easier for others to identify the issue you are engaged with and connects with your cause.
  Respect and be grateful for ANY contribution made by residents, be it two minutes of time, or years of effort. It is very easy to start blaming people for not getting involved, so it is much better to create a positive environment. Also bear in mind that some people who do not contribute may have perfectly reasonable reasons for not doing so, including fear of what a vindictive local authority might do to their situation.

PRACTICALITIES

Build an archive of **ALL** communications with your local authority as it will be vital for contesting decisions, or later legal processes. The amount of documentation this generates can be huge, so we recommend that:

- **On every piece of paper** you receive from your local authority, or from parties associated with them, write the date you received it.
- **Try to keep a timeline** of all consultation events, workshops, notifications, press announcements up to date.
- **Collect** cabinet reports, local authority statements made on websites, and anything to do with the consultation process. The content of documents often gets changed after initial/draft publication so do also keep versions of documents.
- **Label each digital document** (image, .pdf etc) in date order so it's easy to retrieve later i.e SaveCressingham save a "2016.11.04.nameofdocument.pdf" or "YYMMDD_nameofdocument.pdf" naming convention.
- **Get some double-walled cardboard boxes** (aka "document boxes") to keep paper hard copies of documents as a "back-up" for electronic files which are easily lost.

Learn to use the following tools as these are invaluable to collaboratively respond to consultation or work towards judicial review:

- **Google docs** was used to write Cressingham The Peoples Plan. Its 'comments' function, in particular, helps to collaborate on written responses to consultations and legal processes.
- **Dropbox or other file-sharing services** provide a shared space to organise files.
- **Open-source software** such as Libre Office and Gimp respectively provide text and image editing tools for free.
  The www.gofundme.com fundraising website helped finance legal action and general activist endeavours for @savecressingham.
- **www.whatdotheyknow.com** is great for managing FOI requests. Council officers can be slow to respond or actively block access to the information requested through conventional routes so FOI's keep a clear record of questions asked and force an authority to respond. Ignore council officers who say that FOIs are wasting their time or the local authority's money. You have a legal right to ask questions and get them promptly answered and if there's a valid reason for not answering the local authority is obliged to provide details of their refusal.

Figure 37. Fold-out insert: The Regen Cheat Sheet.

Ethical implications

Figure 38. *A 2015 urban studies student field trip in my home. Visitors faces blanked out and my son in the foreground. Academic visits such as this are typical for residents of estates facing regeneration.*

As a resident of Cressingham as well as an artist, activist, and researcher my ethical stance is both novel and challenging. I had already amassed information through years of activist work before I started this project and through preparations for Judicial Review, for example (see fig. 27.). I inhabit a special ethical status because my various roles on Cressingham precede my role as a researcher operating under the ethical framework of Goldsmiths' Department of Design. Furthermore, because I am simultaneously a subject (see fig. 38.) and instigator of the research I must carefully consider the impact of information that I chose to share about Cressingham on both my research and @SaveCressingham. As such, this work involves my continual negotiation of different ethical registers shaped by CGRMC, @SaveCressingham, my neighbours, and family life.

Through discussions with a Goldsmiths ethics contact, I identified guidelines to adhere to. Key to this discussion was clarification that my core participants were residents of Cressingham, particularly those involved in the @SaveCressingham campaign. Other participants included members of the public attending events on Cressingham and those walking through the estate. Because of my adversarial relationship with Lambeth as an activist and difficulties obtaining permissions, I did not consider Lambeth's contractors, councillors, and staff as participants in this project even though I engaged with them on a regular basis and continue to do so. To account for engagements outside of my participants, I considered myself as a participant within my own research project where I report back (to myself) on the things that I observe. While this might seem an ethical sleight-of-hand, it addresses the impossibility of a hard distinction between the many roles I inhabit and allows me to

operate under multiple ethical frameworks.

My ethical approach was to first gain verbal consent by informing participants of the nature of my research and asking if they were happy for me to take pictures or record audio for this research project. I then explicitly obtained written informed consent if I intended to make public an image, audio recording, or written material that identified a person. If I was unable to contact a source or they refused or withdrew their consent at any point, I excluded or anonymised any materials that became part of any art, design, or written output.

On occasion, I spoke with members of the public and recorded conversations with their consent. However, at times I did not have the opportunity to explain the project or obtain contact details. In these circumstances, I anonymised any recorded material. For public events advertising literature or an announcement made clear that the organisers would be making audio/visual recordings and that participants who objected should make themselves known.

My connection with the research topic makes me party to information that presents many ethical challenges, not least when my academic ethical framework conflicts with ethical consideration within an activist campaign and my home life. For example, I occasionally held information that could have impacted the value of people's homes, residents' mental health, people's jobs within Lambeth, legal proceedings, or neighbourly relations, as well as the lives of my partner and children. In these and other circumstances, I either obtained advice from the Goldsmiths Department of Design ethics contact, informal legal advice from lawyers who contribute to @SaveCressingham, or spoke to relevant parties on Cressingham.

Conclusion

This chapter explains my methodological rationale for adopting a method assemblage with a CTP as a principal part of my research approach. In this chapter I introduced the setting of Cressingham including the organisations, processes, and democratic and consultation events associated with Lambeth's database systems. This context showed that multiple research methods are required to explore the inaccessible, ambiguous, and constantly changing nature of these systems. I then set out Law's (2004) formulation of a method assemblage and Agre's (1997) CTP, which enable me to combine activist, art, and technical work alongside research into theories of technology and histories of technical invention. Within these activities, I employ methods of participant observation; Almost Workshops informed by traditions of action research and participatory design; arts techniques such as defamiliarisation and dysfunction; building contraptions; writing code, prose, and annotation; and creating diagrams. These methods produce qualitative data in the form of text, spreadsheets, programming code, GUIs, directory structures, material objects, images, and audio and video recordings.

I argued that my research methods are a process of crafting and bringing together different practices, texts, individuals, and objects to decipher and intervene in a field of relations. This method assemblage does not claim to reveal a singular truth about Lambeth's databases or Cressingham; rather, it allows for a multiplicity and ambiguity of understanding in which institutional and resident truths can conflict. Here, my integration of theory and practice as an interconnected whole is vital. Arts techniques, such as my use of HARMS, open space for ambiguity and Simondon's theory of individuation helps to recognise Lambeth's database systems as an evolving collective of more-than-technical components. Then, Foucault's concept of power/knowledge helps to recognise and analyse institutional, ethical, and other implications of HARMS while undertaking activist and technical work. Allowing for multiplicity and uncertainty, therefore, addresses central methodological problems of this project where I cannot access Lambeth's databases or claim academic impartiality because I seek to prevent the demolition of my family home.

While working on this chapter, it became clear that the project requires a multi-disciplinary approach to identify the technical as a political force that holds potential for social and cultural change. Crucially, I argued that arts techniques of defamiliarisation, dysfunction, amateur making, engineering, and humour can make such relations materially, politically, ethically, and technologically visible. I also argued for a close proximity between text, code, objects, ideas, and materiality as a way of diagramming the directive capacities of technical objects within the space of urban regeneration. My research methodology contributes to practice based design research by demonstrating how an elusive, distributed, politics-enacting socio-technical object can be researched and intervened in. My method assemblage incorporating a CTP, therefore, meets the aims of this project by identifying how to make Lambeth's database systems more accountable to residents and support community aspirations for refurbishment rather than demolition.

.

Chapter 4.
Revealing machines

Introduction

Through this chapter I explore how standardisation, enacted through database and network architectures, instantiates power/knowledge relations on Cressingham. The chapter is divided into three sections that each present a report followed by an analysis of a research activity. First, *An Impossible Code/Diagram*, describes my attempt to create a technical diagram of Lambeth's database systems. Second, *A Calendar View* chronicles my investigation into how Lambeth's bureaucracy is organised around database and network architectures. Third, *the lookup_tables* describes the human impact of everyday list-making on residents lives as a reflection on database structures in Lambeth. In my analysis, I draw from theoretical concepts of the relational machine (Harwood, 2013), human-machine discourse (Foucault, 2002, p.94; Goffey, 2008, p.18), and a technical object-as-process (Simondon, 2016) to address standardisation as a mode of exercised power implicated in human emotion and issues of transparency and accountability on Cressingham.

An Impossible Code/Diagram

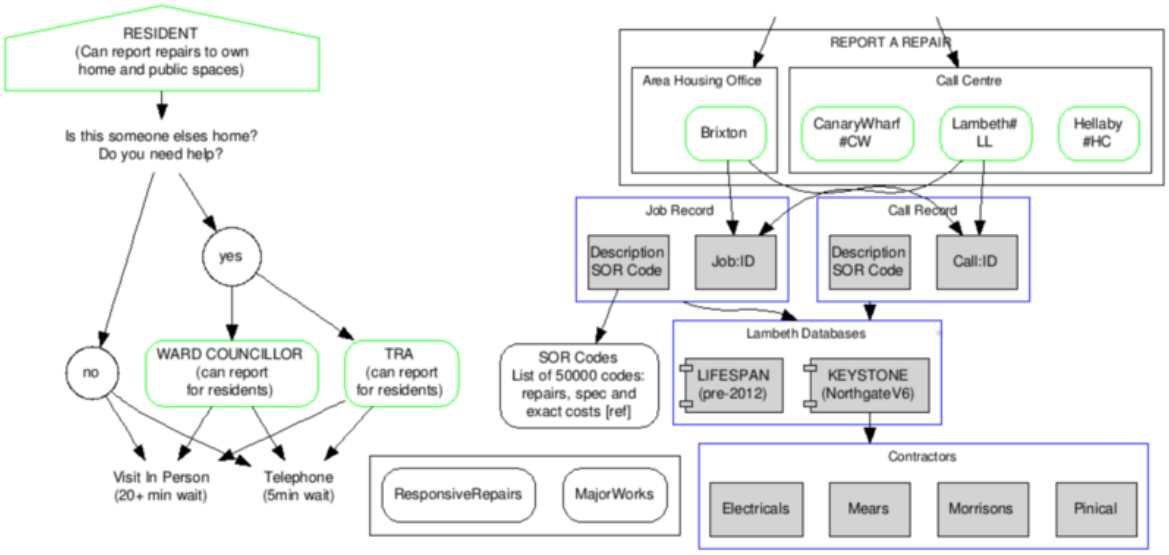


Figure 39. *My attempt to create a diagram of Lambeth's database systems. Automatically generated from DOT code displayed in fig. 40..*

When I started this research project in 2015, I aimed to create a definitive *code/diagram* (see fig. 39.) to reveal a coherent structure in Lambeth's database systems. In preparation for the code/diagram, I spoke to Lambeth call operators, surveyors, and contractors about the technical systems they worked with as I reported or chased repairs on Cressingham. One call operator stated that she worked in Hellaby, Yorkshire, using a database called Sx3. Another operator mentioned that she worked in Canary Wharf, London, with a database called Northgate. Surveyors working on Cressingham variously said that they worked with Sx3, Northgate, and Lifespan database systems. One contractor explained how he copied individual Repairs Jobs *by hand* from Lambeth's database into his

company's database. Through these snatched conversations I identified a mess of technical names, humans, locations, and processes but struggled to determine how these technical and more-than-technical components fit together.

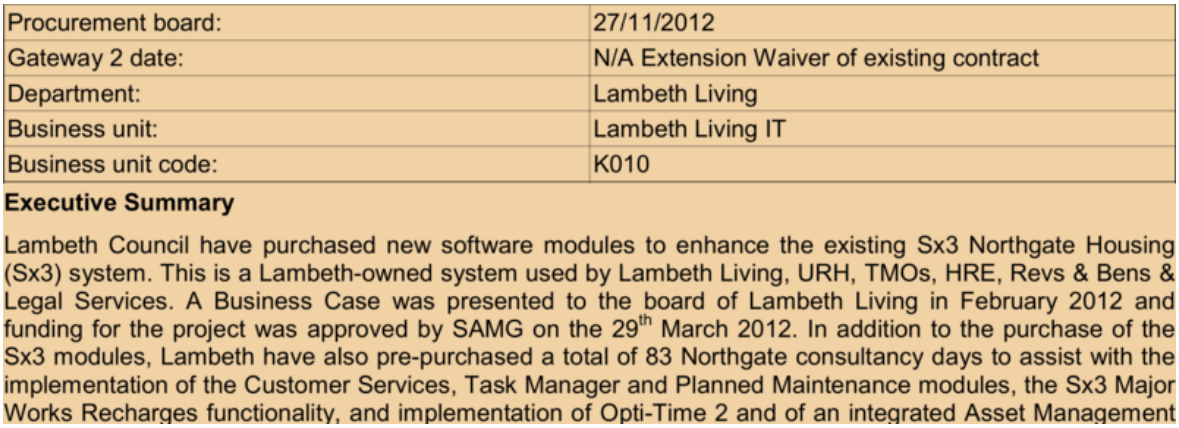
I reasoned that the formal structure of code might help to make sense of the mass of information with which I was faced, to reveal relations between databases, codes, housing practices, and locations. To this end, I worked with a graph description programming language called DOT to automatically generate a line and node-based code/diagram (see fig. 40.) to map who can or cannot report a repair; database names such as Sx3, Lifespan, Keystone, and Northgate; codes I had heard workers use such as call_id, job_id, and SOR; and caller centre locations such as Brixton, Hellaby, and Canary Wharf. My attempt to create a diagram, however, introduced many ambiguities and questions: Where are Lambeth's databases located? Who works with them? How do they interconnect? Are contractor-databases part of Lambeth's systems? What GUIs do Lambeth staff, councillors, and contractors access? What data can they view or edit? These questions meant that I struggled to generate a coherent code/diagram of Lambeth's database systems.

```
Visit [label="Visit In Person\n(20+ min wait)" shape=plaintext]
Telephone [label="Telephone\n(5min wait)" shape=plaintext]
# Reporting: Clusters
subgraph cluster_report {
  label = "REPORT A REPAIR";
  subgraph cluster_call {
    label = "Call Centre";
    Hellaby[label="Hellaby\n#HC" color=green]
    Lambeth[label="Lambeth#\nLL" color=green]
    Canary[label="CanaryWharf\n#CW" color=green]
  }
  subgraph cluster_office {
    label = "Area Housing Office"
    "Brixton"[color=green]
  }
}
```

Figure 40. *Extract of DOT code that generates the code/diagram of Lambeth's database systems.*

While I scanned procurement reports, cabinet-meeting proceedings, and other publicly available documents, I was confused by language inconsistencies and lists of technical components. One Lambeth (2012, p.18) business plan mentioned how *Northgate (Sx3)* had replaced earlier *HICS* and *Saffron* databases, indicating that Northgate and Sx3 were the same database system, where

I had previously understood them to be separate. Then, a Lambeth (2012) procurement decision report (see fig. 41.) described new software modules called *Customer Services*, *Task Manager*, *My Portal & Key Details*, *Planned Maintenance Module*, *Opti-Time*, *Sx3 Major Works Recharges*, and *Asset Management System* that connected a new asset management database to existing databases. This information underlined the interconnected nature of Lambeth's databases, which blurred my understanding of what any single database consisted of.



Procurement board:	27/11/2012
Gateway 2 date:	N/A Extension Waiver of existing contract
Department:	Lambeth Living
Business unit:	Lambeth Living IT
Business unit code:	K010

Executive Summary

Lambeth Council have purchased new software modules to enhance the existing Sx3 Northgate Housing (Sx3) system. This is a Lambeth-owned system used by Lambeth Living, URH, TMOs, HRE, Revs & Bens & Legal Services. A Business Case was presented to the board of Lambeth Living in February 2012 and funding for the project was approved by SAMG on the 29th March 2012. In addition to the purchase of the Sx3 modules, Lambeth have also pre-purchased a total of 83 Northgate consultancy days to assist with the implementation of the Customer Services, Task Manager and Planned Maintenance modules, the Sx3 Major Works Recharges functionality, and implementation of Opti-Time 2 and of an integrated Asset Management

Figure 41. *Composite extract from a Lambeth procurement report discussing Sx3 Northgate.*

I requested a meeting with Lambeth's IT department to clarify my understanding of their technical systems. My enquiries, however, were frustrated by unanswered emails and full telephone answer machine inboxes that would not record a message. Rather than chase these unanswered communications, I issued a FOIA request (see fig. 42.) – a strategy I had learned through years of dealing with unresponsive housing, finance, and regeneration departments. I submitted my FOIA request using the database-backed www.whatdotheyknow.com website to leverage legislation, force a reply, and generate an easy to follow ledger of communication. However, Lambeth refused my FOIA request because of the time it would take to address my questions.

Human-machine discourse, the relational machine, and unpredictability

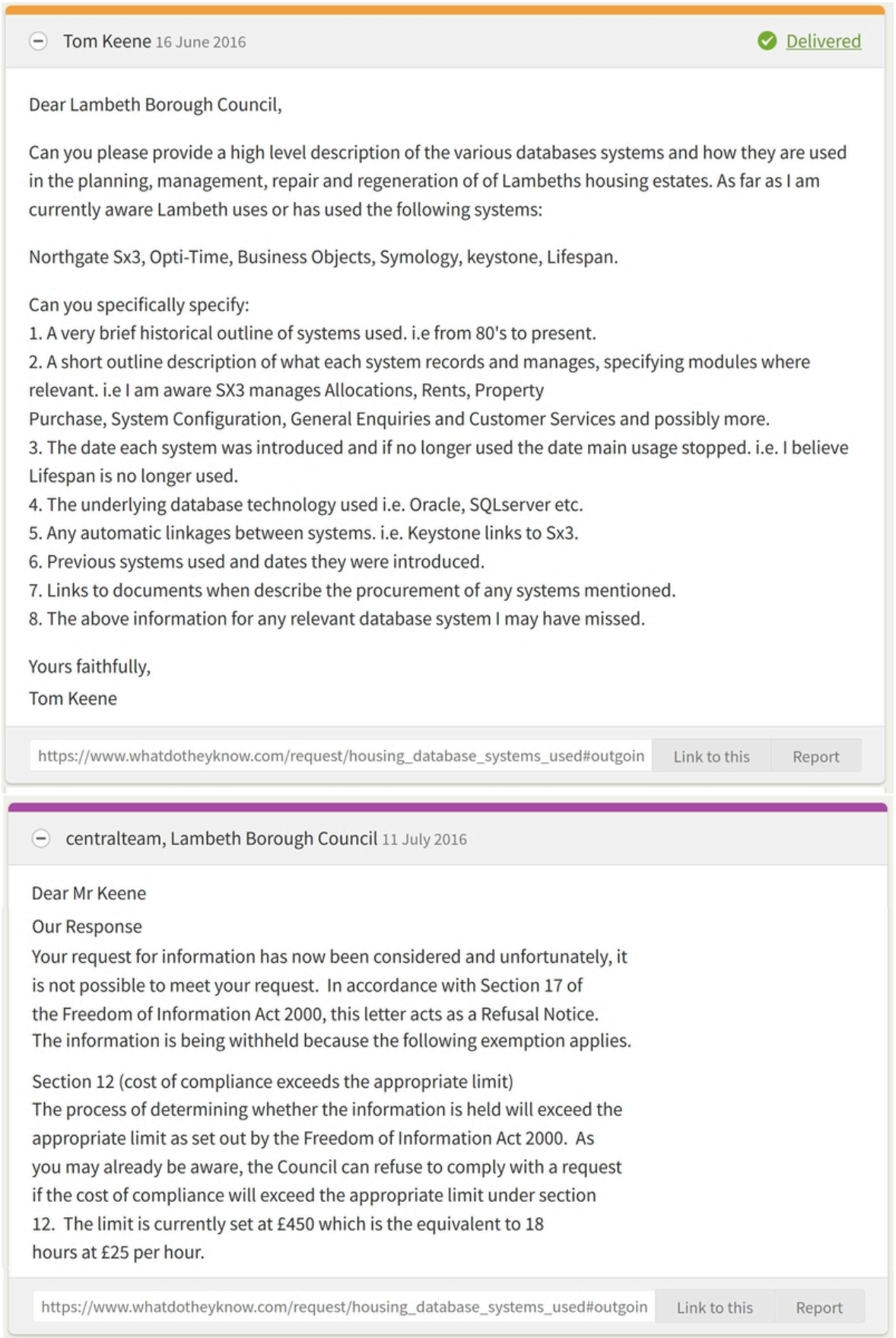
The code/diagram can be understood as a Foucauldian statement of what residents cannot see, access, or comprehend within partially algorithmic processes of reporting a repair and observing an outcome. Here, I take inspiration from Goffey (2008, pp.15, 17), who describes an algorithm as a precisely controlled series of steps that act within ill-defined networks and actions. This means that predicable and standardised computational processes connect with issues of ambiguity, power, and knowledge. Indeed, Goffey specifically addresses power and knowledge because he identifies an algorithm as a kind of Foucauldian statement (as discussed in chapter two) that emerges from a human-machine discourse. The human-machine discourse of Lambeth's databases involves hidden programming code, software modules, database schemas, SQL queries, and GUI components that mediate between human worlds and the abstractions and hardware of machines. This discourse is rendered partially visible within procurement reports, business plans, and even everyday conversa-

tion. Identifying this discourse, therefore, is important because it points to how, where, and what data or knowledge about Cressingham can come into existence within the messy and unpredictable world of human-technical collectives.

In working with the code/diagram, I revealed Lambeth's databases as spaces of ambiguous, ever-changing, and interconnected databases, locations, humans, codes, software modules, and housing practices. Here, Harwood's (2013, p.18) concept of the relational machine articulates this space as the systematic and collective endeavour of humans and machines to amass and then act on information. These more-than-technical endeavours, therefore, are how Lambeth performs much of its work so they should be understood as the process of governing, controlling, and acting on Cressingham's buildings and residents. These database endeavours are thus the core of Lambeth in that they are the manifestation of strategies, aspirations, and programs of work that emerge within an authority. However, describing Lambeth's repairs and maintenance service as *systematic* can be problematic because the term indicates a predicable process, whereas, the reality for many Cressingham residents is a repairs service that can defy logic because it produces poor quality or uncompleted Repairs Jobs and lines of accountability that are impossible to fathom.

It is tempting to assign blame for Lambeth's inefficiencies in repairs and maintenance to their strategies of managed decline. For instance, Lambeth are clearly reluctant to spend money on maintaining estates they aspire to knock down − the result of which is that residents are encouraged to leave rather that live in unmaintained homes. However, it would be wrong to characterise all issues with repairs on Cressingham as a product of regeneration strategies because there are multiple factors that mediate how repairs are enacted, not least of which are human and technical error, party-politics, legislation, human workload, forgetfulness, finances, or simply the tenacity of a resident chasing a repair. As one finance officer commented, "I am as frustrated as you are trying to get information, all these different departments [such as estate services, home-ownership, legal], have access to information but we don't. You should see the internal emails." What I take from this comment is that Lambeth's databases generate a disconnect where residents as well as council workers struggle to comprehend Lambeth's housing practices and data. This disconnect, I argue, is accelerated by database systems that blur accountably for individuals actions' in Lambeth through distributions of data and work across multiple locations.

Due to the unpredictable and unknowable characteristics of Lambeth's relational machines, I abandoned my attempt to definitively describe what Lambeth's databases *are*. Instead, I shifted my focus to what they *do* at the specific moments I engage with them. This allowed me to more easily consider how standardisation operates through Lambeth's databases to continually produce and organise relations between data-entities, workers, organisations, buildings, contracts, work environments, and Lambeth, and many other entities.



Tom Keene 16 June 2016 — Delivered

Dear Lambeth Borough Council,

Can you please provide a high level description of the various databases systems and how they are used in the planning, management, repair and regeneration of of Lambeths housing estates. As far as I am currently aware Lambeth uses or has used the following systems:

Northgate Sx3, Opti-Time, Business Objects, Symology, keystone, Lifespan.

Can you specifically specify:
1. A very brief historical outline of systems used. i.e from 80's to present.
2. A short outline description of what each system records and manages, specifying modules where relevant. i.e I am aware SX3 manages Allocations, Rents, Property
Purchase, System Configuration, General Enquiries and Customer Services and possibly more.
3. The date each system was introduced and if no longer used the date main usage stopped. i.e. I believe Lifespan is no longer used.
4. The underlying database technology used i.e. Oracle, SQLserver etc.
5. Any automatic linkages between systems. i.e. Keystone links to Sx3.
6. Previous systems used and dates they were introduced.
7. Links to documents when describe the procurement of any systems mentioned.
8. The above information for any relevant database system I may have missed.

Yours faithfully,
Tom Keene

https://www.whatdotheyknow.com/request/housing_database_systems_used#outgoin Link to this Report

centralteam, Lambeth Borough Council 11 July 2016

Dear Mr Keene

Our Response
Your request for information has now been considered and unfortunately, it is not possible to meet your request. In accordance with Section 17 of the Freedom of Information Act 2000, this letter acts as a Refusal Notice.
The information is being withheld because the following exemption applies.

Section 12 (cost of compliance exceeds the appropriate limit)
The process of determining whether the information is held will exceed the appropriate limit as set out by the Freedom of Information Act 2000. As you may already be aware, the Council can refuse to comply with a request if the cost of compliance will exceed the appropriate limit under section 12. The limit is currently set at £450 which is the equivalent to 18 hours at £25 per hour.

https://www.whatdotheyknow.com/request/housing_database_systems_used#outgoin Link to this Report

Figure 42. *An FOIA requesting information about Lambeth's database systems. Shows an edited version of the response (Keene, 2015).*

A Calendar View

Week | Month | Events | View weekends

July 1999

Monday	Tuesday	Wednesday	Thursday	Friday
28 Cabinet Standards Committee	29	30	1	2
5 Cabinet	6 Planning Applications Committee (replaced by PA...	7 Policy Committee	8	9

Figure 43. *Lambeth's calendar of meetings and decisions.*

Lambeth provide a calendar (see fig. 43.) of cabinet and planning meetings on their local democracy and decision making website (henceforth, decisions calendar). The decisions calendar provides a front-end GUI to a publicly available database system giving me direct access to a Lambeth database, albeit mediated by hidden access permission structures that determine what data I can view. Residents can access the calendar via a Uniform Resource Locator (URL) that allows me to navigate Lambeth's archive of council decisions and associated documents going back to 1999 (see fig. 46.). These decisions include cabinet approval for the demolition of Cressingham so the calendar plays a critical part in the politics of regeneration because it provides a ledger of accountability.

My exploration of the decisions calendar through writing code and analysing its URLs exposes how layers of standardisation produce a complexity of local government that I encountered in my work with the code/diagram. Andrew Barry's (2001, p.67) socio-technical analysis of the European Union provides insight here when he highlights how a vast array of standards, objects, and technical devices form and are formed in relation to public institutions. Accordingly, my exploration of the decisions calendar identifies how standardisation contributes to a transparency of government processes while also rendering the majority of those processes invisible.

The standardised structure of the calendar URL allowed me to write a programming script (see fig. 44.) titled the *Cabinet Document Parser* (henceforth, DocParser) to automatically download Lambeth's entire corpus of decision-making documents from 1999 to the present day. The DocParser transforms the human gesture of clicking a link into an automated process that generates every possible URL to display the calendar interface (see fig. 44.). The DocParser employs these URLs to download over 260 HTML pages from which to extract hundreds more URLs and HTML

pages that link to thousands of documents. After running the DocParser, and over the course of a few hours, the script retrieved 7 gigabytes of archived files, though it had still not finished its work.

```
# Generate a list of URLS for every month and year given a starting year
def gencalendarurls(self, startyear):
  urls = []
  thisyear=int(time.strftime("%Y"))
  thismonth=int(time.strftime("%m"))
  # Loop through years and months until present
  for year in range(startyear,thisyear+1):
    for month in range(1,13):
      if month < 10:
        pref = '0'+str(month)
      url = [year,pref, 'http://moderngov.lambeth.gov.uk
      /mgCalendarMonthView.aspx?M={}&DD={}'.format(month, year)
      ]
      urls.append(url)
      if year==thisyear and month==thismonth: break
  self.msg = "Built URLS"
  return urls
```

Figure 44. *Extract of python code that automatically generates a list of URLs. The code automatically downloads every meeting date, description, and associated document.*

I accelerated the process by adding *threaded functions* to simultaneously download multiple documents. While doing so, I recognised the impossibility of reading and interpreting such a large volume of information that is organised for both a human and machine readership − where the fact or truth of the archives' existence can seem more important than its content. For example, the online archive of documents ensures that residents can see cabinet decisions within a standardised publishing structure which imparts a sense of accountability. However, the effort and expertise required to contest these decisions mean they are rarely overturned within existing democratic processes in Lambeth.

I investigated the AI technique of natural language processing to automatically search through the text for decisions relating to Cressingham or other estates facing regeneration; I hoped to discover information that might prove helpful to the @SaveCressingham campaign without knowing what that information might be. While programming, I was acutely aware of how AI might support my career by opening access to academic funding, pique the interest of art curators eager to explore the social impact of new technologies, or position me within the commercial sector. At this point, I stopped programming. This was partially because I realised that a Google *site search* in the form

of “Cressingham site:https://moderngov.lambeth.gov.uk” would out-perform my DocParser code and would thus be of more immediate use to the @SaveCressingham campaign, and partially because I was struck by how the database-backed calendar had instantiated relations between human gesture, optimisation of effort, computer hardware, HTML code, a ledger of decision-making in Lambeth, and aspirations for my career. By exposing these more-than-technical associations, I developed a sensitivity to the associated milieu of Lambeth’s database systems and the role of human components − with their desires and aspirations − that shape its function.

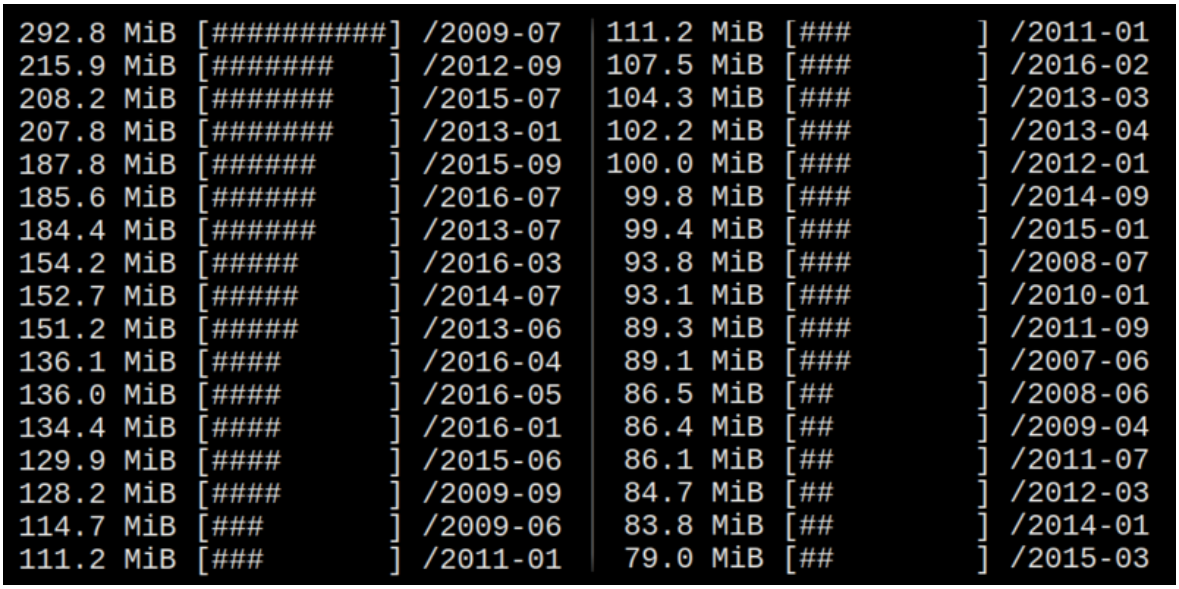


Figure 45. *A list of documents automatically downloaded into a directory structure. The directories are ordered by year, month, and file size.*

Unpacking a URL

To orientate my attention beyond a technical mindset, I constructed an image of the calendar URL (see fig. 46.) to think-with its more-than-technical relations. Constructing this image allowed me to slowdown my technical thought process and record associations without explanation as I assessed components of the URL. While constructing the image, I worked with ubiquitous Unix network troubleshooting tools *Traceroute*, *Ping*, and *Curl*. In doing so I exposed a milieu of network architectures and standards that surround and sustain any database in Lambeth.

The *http://* component of the calendar URL refers to hypertext transfer protocol (HTTP) web standard. My browser employs HTTP to *get* a hypertext markup Language (HTML) file, Cascading Style Sheets (CSS), JavaScript files, image files, and other file formats that combine into the calendar interface rendered in a browser. Below HTTP, the domain name system (DNS) resolves the sub-domain moderngov.lambeth.gov.uk into the internet protocol (IP) address 91.216.55.115. IP ensures that every machine connected to a computer network is assigned a unique address. Transmission control protocol (TCP) combines with IP (commonly referred to as TCP/IP) to transmit

packets of data from Lambeth's web server through multiple routers, the air-gap of my WiFi connection, onto my laptop, and into my browser software and screen. TCP/IP involves: the segmentation of data into individual data packets addressed with a destination IP and its location within a sequence; the individual transmission of each packet through available routers and networks; and re-assembling the data packets into their original sequence. Consequently, http:// identifies how network protocols and standards share a concern with the rapid transmission of information through a network.

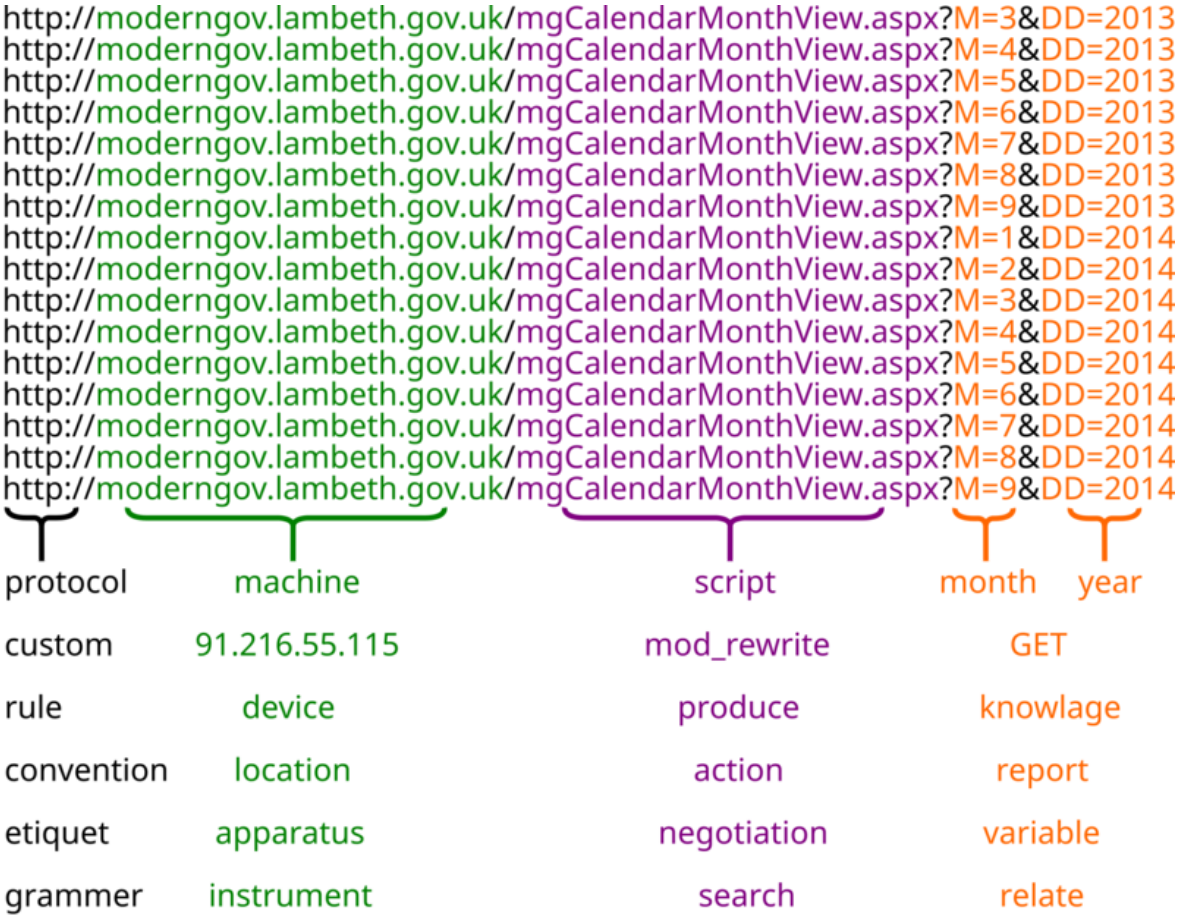


Figure 46. *A poetic exercise to think with a URL structure.*

The dots and slashes of the calendar URLs identify a segmentation and distribution of Lambeth's housing and other services. The ping command reveals that lambeth.gov.uk, points to the 52.31.209.82 IP address and that moderngov.lambeth.gov.uk points to the 91.216.55.115 IP address. Curl reports, via the ipinfo.io website, that the webservers associated with those IP addresses are located in London and Dublin and that, unsurprisingly, *Virgin Media Limited* and *Amazon* are somehow involved in their management. Added to this, a Traceroute command (see 47.) reveals thirteen devices involved in the transfer of data from the server hosting moderngov.lambeth.gov.uk and my laptop at this particular moment and location. Accordingly, Ping and Curl expose an evolving domain of machines, protocol, databases, organisations, and locations that predicate Lambeth's distribution of information, from a single field of data to an entire cabinet report.

```
$ traceroute moderngov.lambeth.gov.uk
1 _gateway (192.168.1.254)
2 172.16.10.85 (172.16.10.85)
4 136.hiper04.sheff.dial.plus.net.uk (195.166.143.136)
  140.hiper04.sheff.dial.plus.net.uk (195.166.143.140)
5 core1-BE1.southbank.ukcore.bt.net (195.99.125.130)
6 194.72.16.96 (194.72.16.96)
  peer7-et-0-1 5.telehouse.ukcore.bt.net (109.159.252.90)
7 109.159.253.101 (109.159.253.101)
  109.159.253.63 (109.159.253.63)
8 **
9 **
10 popl-core-2b-ae14-0.network.virginmedia.net (62.254.42.10)
11 popl-lam-4-tenge21.network.virginmedia.net (62.255.81.246)
12 popl-lam-4-tenge24.network.virginmedia.net (82.14.168.5)
13 * 36.82-254-62.static.virginmediabusiness.co.uk (62.254.82.36)

$ ping lambeth.gov.uk
PING lambeth.gov.uk (52.31.209.82) 56(84) bytes of data.

$ ping moderngov.lambeth.gov.uk
PING moderngov.lambeth.gov.uk (91.216.55.179) 56(84) bytes of data.

$ curl ipinfo.io/91.216.55.115
 "ip": "91.216.55.115",
 "city": "London",
 "loc": "51.5085,-0.1257",
 "org": "AS5089 Virgin Media Limited"

$ curl ipinfo.io/52.31.209.82
 "ip": "52.31.209.82",
 "city": "Dublin",
 "loc": "53.3346,-6.2733",
 "org": "AS16509 Amazon.com, Inc.",
```

Figure 47. *Traceroute, Ping, and Curl. Exploring moderngov.lambeth.gov.uk.*

The www.dnsdumpster.com website revealed sixty-six sub-domains associated with the lambeth.gov.uk domain name (see fig. 50.). These domains include *estateregeneration.lambeth.gov.uk*, *councillor.lambeth.gov.uk*, *revenues.lambeth.gov.uk*, *planning.lambeth.gov.uk*, *housingapplication.lambeth.gov.uk*, and *camp-asa-5540-1.lambeth.gov.uk*. Each domain hints at different kinds of housing-related practices and modes of government. Behind these public-facing domains I can guess that secure private networks hide further domains, IP addresses, web-servers, databases, and network-accessible GUIs that are never in public view (see fig. 48.).

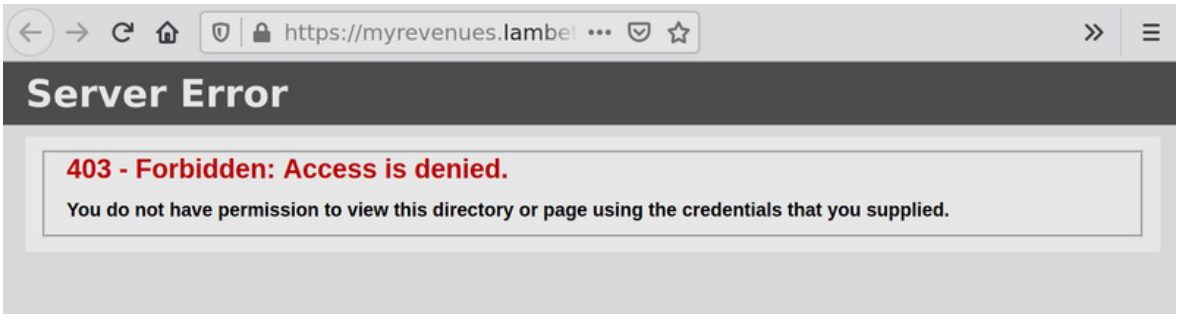


Figure 48. *Access denied to Lambeth's myrevenues.lambeth.gov.uk website. I obtained this sub-domain name via the www.dnsdumpster.com website.*

Through a Google-search of the *moderngov* segment of the URL, I can infer that an organisation named Modern Mindset built Lambeth's moderngov.lambeth.gov.uk website. A further search reveals calendars with a similar URL structure on Surrey, Barnsley, and other council websites. The Civica Group is a global corporation that acquired Modern Mindset in 2018 and built the Keystone database in 2014 which is used by Lambeth.

The *gov.uk* URL suffix identifies that the US-based Internet Corporation for Assigned Names and Numbers (ICANN) assigned permission for the UK government to use the gov.uk top-level domain name. In turn, the UK's Digital Service will have granted Lambeth permission to use this domain.

The *mgCalendarMonthView.aspx* segment of the URL indicates that the website was written using a Microsoft technology called .NET involving VBSCRIPT or C# programming code. However, the HTML source code (see fig. 49.) of the calendar tells me that the website was constructed with a web-framework called Drupal which is written in the PHP programming language. The .asp section of the URL, therefore, could be the result of historic website functionality or a programmer merging the functionality of Drupal with another database such as Lambeth's anite@work document management system − which I suspect maintains archives of council documents, leasehold, tenancy, and other contractual agreements.

The *?M=3&DD=2013* section of the URL tells me that an underlying database powers the calendar. The ampersands delineate two keys with associated variables. The *M* key represents a month, and *DD* represents a year, both of which are passed to an SQL query that instantiates relations between tables, columns, and fields of data to return a list of meeting dates and associated documents for

a given month and year. By changing the URL variables' text, I can directly communicate with a Lambeth database to reconfigure how I access information outside the confines of a GUI. In doing so, this exposes how database systems expose aspects of their internal logic, which introduces the potential of new associations (machines, code, humans, processes), knowledge, and power dynamics between Lambeth and residents − which is a theme that I explore further through my discussion of the Shadow Database in chapter six.

Figure 49. *Extract of HTML code from Lambeth's moderngov website. The code indicates that the website employs the open-source web development framework Drupal.*

My detailed description of the URL is by no means exhaustive. I can turn, for example, to the computer scientist Charles Petzold (2000, p.290) to identify further relations between the URL and 7-bit binary codes (0000000 through to 1111111), the American Standard Code for Information Interchange (ASCII), hexadecimal codes 00h through 7Fh, and hardware components dedicated to processing representations of text via binary flows of electricity − all of which relate to histories of technical standards and invention. However, what I aim to communicate through this intricate technical detail is that Lambeth cannot function in the way it does without every single one of these technical components that collectively produce, or add to, the experience and dynamics of local and national government. Thus, technical protocols are inseparable from the function of local and national government which invites speculation on how alternative protocols that might produce different forms of outcome.[1]

1 Such speculation is evident within the work of technologists, artists, and scholars (e.g., Nabben et al., 2021; Catlow et al., 2017) who explore the potential of blockchain technologies and protocol to produce novel forms of cooperative data ownership and governance. While a deeper discussion of blockchain technologies is outside the remit of this text, I propose further research in this area within the concluding chapter.

```
access.lambeth.gov.uk                    adfs.lambeth.gov.uk
anyconnect.lambeth.gov.uk             anypoint.lambeth.gov.uk
appointments.lambeth.gov.uk               apps.lambeth.gov.uk
bincollections.lambeth.gov.uk         bookings.lambeth.gov.uk
centrebookings.lambeth.gov.uk           dialin.lambeth.gov.uk
contender.lambeth.gov.uk             csweb-ext.lambeth.gov.uk
desktop.lambeth.gov.uk         comp-asa-5540-1.lambeth.gov.uk
diy.lambeth.gov.uk                 e-councillor.lambeth.gov.uk
eap.lambeth.gov.uk                         emtp.lambeth.gov.uk
epermits.lambeth.gov.uk    estateregeneration.lambeth.gov.uk
extranet.lambeth.gov.uk                    gw1.lambeth.gov.uk
gw2.lambeth.gov.uk         highwaysenforcement.lambeth.gov.uk
intranet.lambeth.gov.uk      highwayslicences.lambeth.gov.uk
jobs.lambeth.gov.uk              housingadvice.lambeth.gov.uk
landmark.lambeth.gov.uk    housingapplication.lambeth.gov.uk
libraries.lambeth.gov.uk   housingmanagement.lambeth.gov.uk
secure.lambeth.gov.uk              landcharges.lambeth.gov.uk
lyncdiscover.lambeth.gov.uk                mail.lambeth.gov.uk
maps.lambeth.gov.uk                        meet.lambeth.gov.uk
moderngov.lambeth.gov.uk            myrevenues.lambeth.gov.uk
nlishub.lambeth.gov.uk             officeweb-ext.lambeth.gov.uk
onlinepermits.lambeth.gov.uk          opendata.lambeth.gov.uk
opportunity.lambeth.gov.uk      parkingphotos.lambeth.gov.uk
pcbooking.lambeth.gov.uk     pcnevidence-test.lambeth.gov.uk
pcnevidence.lambeth.gov.uk                 pcns.lambeth.gov.uk
pensions.lambeth.gov.uk          peoplesearch.lambeth.gov.uk
planning.lambeth.gov.uk            rapidforms.lambeth.gov.uk
revenues.lambeth.gov.uk                    sip.lambeth.gov.uk
speculum.lambeth.gov.uk              spoccnet.lambeth.gov.uk
spoccnettest.lambeth.gov.uk           testdiy.lambeth.gov.uk
wasteservice.lambeth.gov.uk            webcon.lambeth.gov.uk
websearch.lambeth.gov.uk          www.landmark.lambeth.gov.uk
xmpp.lambeth.gov.uk    www.housingmanagement.lambeth.gov.uk
```

Figure 50. *A list of Lambeth's sub-domains.*

Technical standards and control

Technical standards are integral to how Lambeth generates and distributes information about Cressingham as an exercise of its authority. As Beniger (1986, p.311) puts it, technical standards and protocol are an integral part of a society of control. As such, my laboured description of the calendar URL aims to impart a sense of how everyday technologies and standards produce an experience of local government in Lambeth. I acknowledge, however, that it is hard to connect the intricacies of TCP/IP, the relational model, or other technical standards to an experience of regeneration on Cressingham. As such, it is important to remember that the core concern of database and network standards is on the interoperability between machines. Technical standards, therefore carry societal aspirations for perfectly functioning and interconnected machines. The reality in Lambeth, however, is that these standards allow for adhoc implementation, fragmentation, and continual change of database and other technical systems that Lambeth, notably, identifies as a core risk to their work as an authority (see fig. 51.). This means that Lambeth enacts government controls through its database systems while simultaneously being shaped by what those technical systems allow.

SMB0034 - IT Obsolescence CORPORATE APPROACH TO ICT: The Council lacks a corporate approach to implementing ICT systems. Systems are fragmented across the council and often implemented on an ad-hoc basis	Serious 3	Very likely 4	High 12

Figure 51. *Extract from Lambeth's 2020 risk register.*

Munster (2013, p.75) underlines that databases and networks involve the detachment of data from its infrastructure, the things it emerges from, represents, and travels through. Thus, the relationality of network standards, databases, and data are politically, epistemically and aesthetically coextensive. This aesthetic involves the fragmentation of data-representations of Cressingham through data-packets and fields of data that operate as markers of government accountability. As I established through my work with the code/diagram, this fragmentation has political consequences because it generates a disconnect where it is impossible for residents to hold individual humans in Lambeth to account without taking legal action. However, even such action presents issues associated with access to expertise, the ability to finance legal processes, availability of time, and the impact of dealing with Lambeth's bureaucracy on mental well-being − the act of continually chasing a response or getting clear answers to questions, for example, can be an upsetting, stressful, and exhausting process.

International technical standards introduce the possibility that my DocParser code could download a vast number of documents from multiple UK councils or authorities across the globe who use similar systems to those Lambeth uses. The DocParser code as well as Lambeth's calendar, there-

fore, operate within a space of international agreements, UK government legislation, and corporate interests. Technical standardisation produces a global alignment of housing practices, democratic process, and technologies that are infused with the aspirations of commercial organisations and corporations who seek to gain market dominance. These processes and entities are also infused with government aspirations for *resident participation and accountability* which is recognised by residents and scholars alike as problematic on Cressingham (e.g. Douglas and Parkes, 2016; Watson, 2020). Indeed, while instantaneous access to cabinet reports or Office of National Statistics housing data meet legislative obligations for government transparency, this transparency is a fallacy when considering the ways in which technical standards produce a complexity of local government that is impossible to fathom.

The lookup_tables

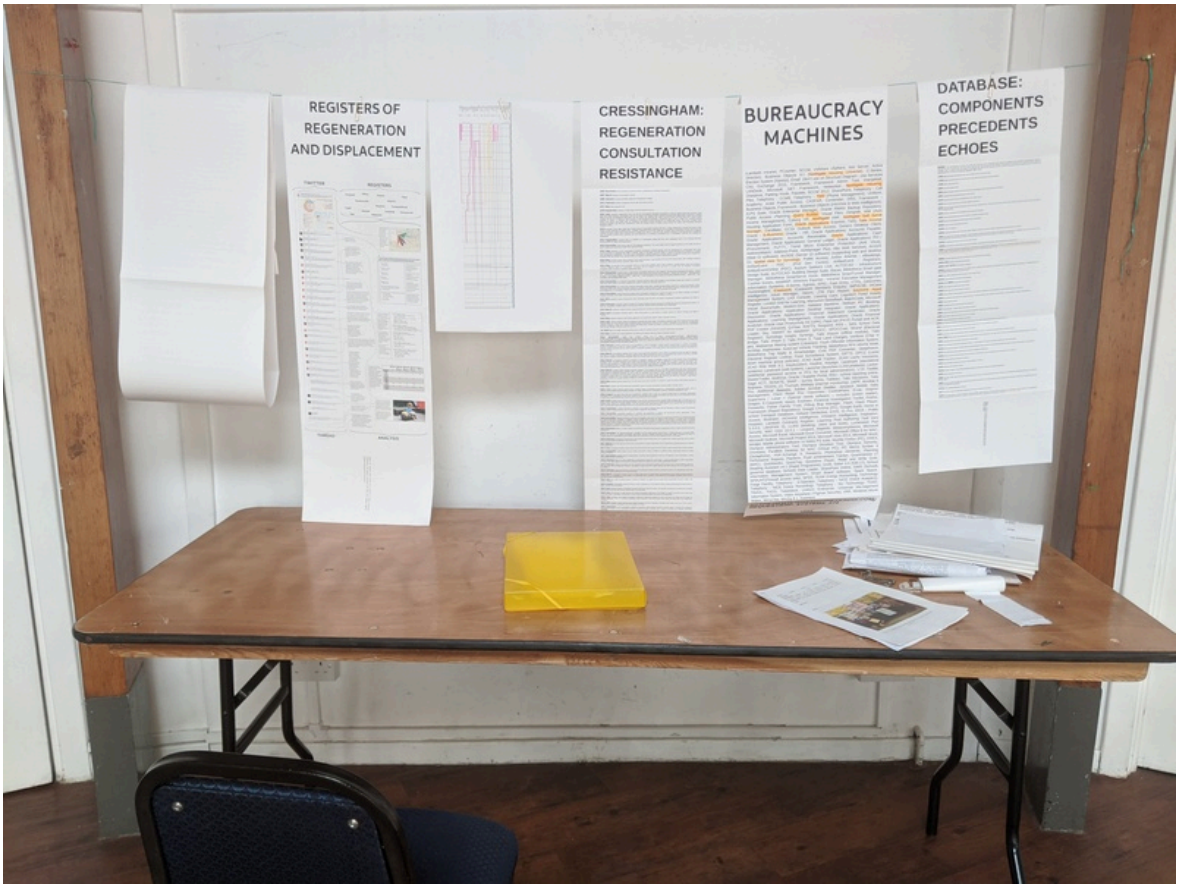


Figure 52. *Working on the lookup_tables in the Rotunda.*

In this section, I discuss multiple lists, which I call the lookup_tables, that document: my personal repairs issues (see fig. 56.); Lambeth's consultations with residents (see fig. 65.); technical and legislative relations in Lambeth (see fig. 91.); and histories of technology that are recognisable in Lambeth's database systems (see fig. 17.). I initially considered these lists to be marginal to my research, though I eventually came to recognise the lookup_tables as an essential means to

explore the live status, directive capacities, and human implications of Lambeth's databases on Cressingham.

In working with the lookup_tables, I take inspiration from Mark Marino (2020, p.166) to explore philosophical ideas within simultaneous technical, academic, activist, legal, collective, and personal endeavours. Marino (2020, p.166) argues that the media theorist Fredrick Kittler used programming to interface with a machine to trace philosophical ideas and then express them in code. The lookup_tables extend Marino's proposition and provide space to engage with technical and philosophical concepts as I engage with intersecting technical, activist, personal, and government efforts.

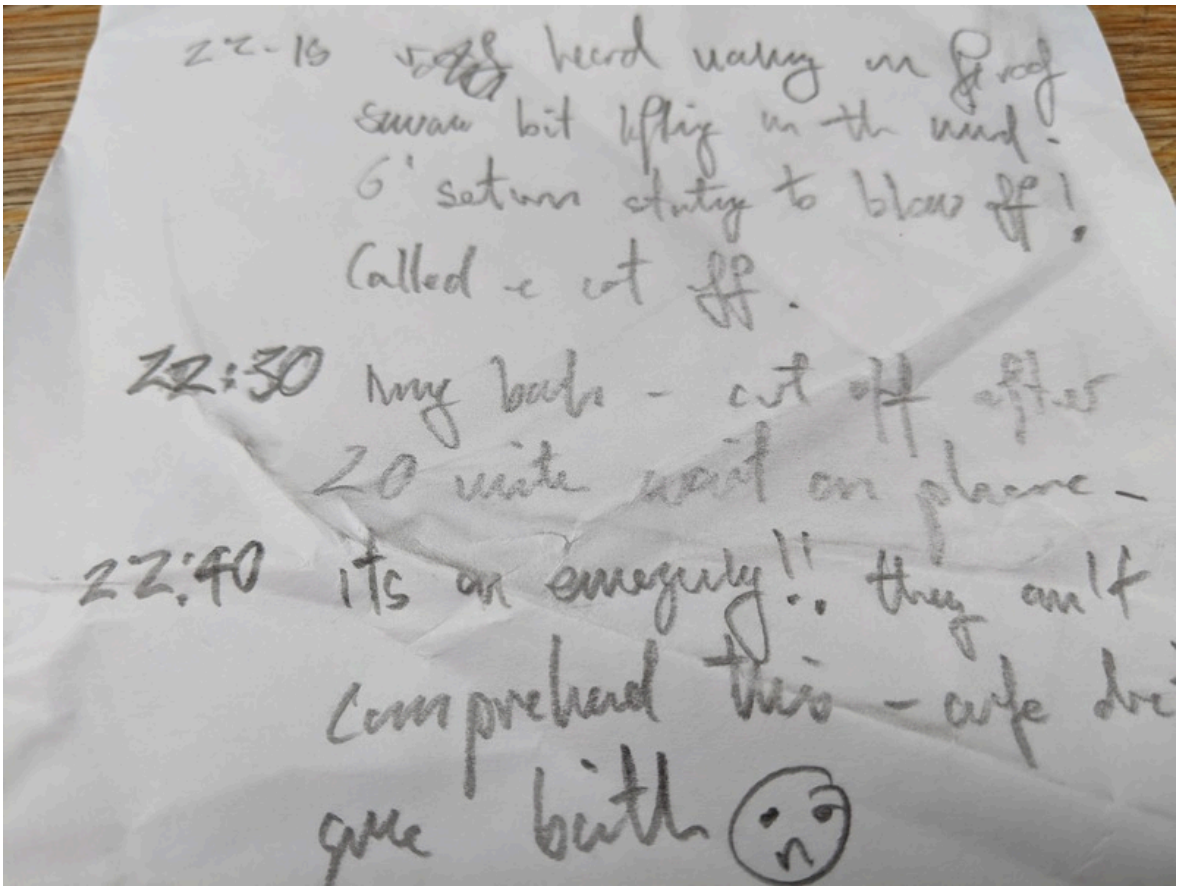


Figure 53. *Pencil and paper list documenting telephone calls with Lambeth's call-centre in 2012.*

I argue that the live status of Lambeth's databases limits the possibility of meaningful democratic participation. I draw from Simondon's concept of a technical object and Foucault's idea of a discursive space to make this argument. As a technical object, the lookup_tables have evolved through hand-written lists, printed documents, and digital files. As a discursive space, the lookup_tables point to the intersecting domains of law, technology, accounting, democratic decision-making, and party-politics surrounding database systems and housing practices in Lambeth.

Before I proceed, it is essential to highlight that my analysis of the lookup_tables may seem more suited to my methodology in chapter three. Indeed, everyday lists *are* a method of coping with large

volumes of information. However, because Lambeth's databases are also methods of dealing with large volumes of information, the lookup_tables provide a lens to analysis. Therefore, I frame the lookup_tables as art and technical objects (Simondon, 2016) to defamiliarise their status as personal, activist, and academic tools. In doing so, the lookup_tables occupy a hazy status between research, activist, art, and technological objects, processes, and methods.

A description of evolving artefacts

My *Personal Timeline* (see fig. 56.) was the first lookup_table I created in 2012 before starting this PhD, though I did not conceive of it in those terms at the time. The genesis of my Personal Timeline can be found on scraps of paper (see fig. 53.) on which I hastily wrote times, dates, and descriptions of storm damage to my home and my attempts to force to Lambeth instigate repairs. As I dealt with various housing, complaints, insurance, finance, and legal departments, I transformed these rough notes into more formalised timelines to optimise how I worked with them. My Personal Timeline records failures to repair my home, including water ingress to both bedrooms and my front door area that Lambeth has not rectified after more than eight years of my complaints. The timeline documents how, in 2018, I issued a legal disrepair claim and Lambeth's subsequent 2020 compensation payment to me of £25,000 to cover legal fees, redecoration, compensation, and avoid court proceedings. Residents on Cressingham and across the borough report similar experiences which points to systemic housing management issues in Lambeth as evidenced by the £3.3m Lambeth (2015) paid in disrepair claims during 2015.

11-07-14 TheCo-operativeCouncil report whole.pdf	PDF document	4.7 MiB	14/11/2012 10:48	Tom Keene
12-10-22 Cabinet mtng appendices Community Assets.pdf	PDF document	2.4 MiB	14/11/2012 10:49	Tom Keene
12-10-22 CabinetMinutes.pdf	PDF document	139.9 KiB	14/11/2012 10:49	Tom Keene
12-10-22 Lambeth Estate Regeneration Programme Strategic D...	PDF document	193.9 KiB	14/11/2012 12:06	Tom Keene
12-05-09 Brixton Area Housing Forum 09 May 2012.pdf	PDF document	290.0 KiB	14/11/2012 12:22	Tom Keene
12-03-21 BrixtonAreaHousingForum 21March2012.pdf	PDF document	270.6 KiB	14/11/2012 12:44	Tom Keene
12-07-04 Lambeth Housing Scrutiny SubCttee 04july2012 Minut...	PDF document	146.5 KiB	14/11/2012 12:45	Tom Keene
12-07-25 Brixton Area Housing Forum - 25July2012 minutes.pdf	PDF document	264.9 KiB	14/11/2012 12:45	Tom Keene
11-05-04 BrixtonAreaHousingForum 04May2011.pdf	PDF document	434.5 KiB	14/11/2012 12:45	Tom Keene
11-03-22 BrixtonAreaLeasholdersForum AGM 22march2011.pdf	PDF document	788.7 KiB	14/11/2012 12:46	Tom Keene

Figure 54. *Archive of over 600 files organised in date-order. Used as preparation for two resident-led judicial reviews.*

The *Cressingham: Regeneration Consultation Resistance* (see fig. 65.) lookup_table (henceforth, Consultation Timeline) documents multiple consultations between Lambeth and residents addressing the future of Cressingham. The origins of the Consultation Timeline are in numerous activists' personal notes, a network-accessible Google Document (see fig. 58.), and an associated *File Archive* (fig. 54.) of over 600 documents prepared by @SaveCressingham activists in preparation for two judicial reviews against Lambeth's decisions to demolish Cressingham. The Consultation Timeline points to an evolution of Lambeth's housing, regeneration, and consultation strategies that impact whether and how repairs are undertaken on Cressingham (see fig. 59.).

Lambeth: Authority, Legislation, Technology (henceforth, Legislation/Tech Timeline), started life as a space to record technical names and associations as I involved myself in consultation, activist, and research practices over many years (see fig. 91.). The genesis of the Legislation/Tech lookup_table is difficult, if not impossible, to pinpoint because it involves mergers, bifurcations, and abandonments of many earlier lists. The Legislation/Tech Timeline was my attempt to connect emergent housing technologies, practices, and policies in Lambeth with histories of compulsory purchase; the categories of decent and un-decent home; asset management surveys, spreadsheets, and databases; software modules; digitisation of paper documents; transfers in ownership of council built homes; and administrative areas such as the establishment of the Metropolitan Borough of Lambeth − all of which resonate through Lambeth and the ways they act on Cressingham.

Finally, the *Database: Components Precedents Echoes* lookup_table (henceforth, the Components Timeline) lists histories of technical concepts and artefacts that underline the evolutionary status of Lambeth's database systems and bureaucracy (see fig. 17.). Their precedents include clay tablets that were created in 3500BC and used to administer harvests; lookup tables of values created in India in 499 AD; William Playfair's 1786 invention of line, area, and bar charts; telegraph systems that exercise control over distance; Watt's 1788 steam governor used in steam trains that accelerated the distribution of goods and information; 1800s modern offices; and 1840s packets of standardised sizes that are reminiscent of data packets in a network.

As art objects

I acknowledge that the lookup_tables identify an overwhelming amount of information and changing associations that are impossible to describe in their entirety. For instance, I can explain a single repair in terms of Lambeth's strategies of maintenance and repair, capitalist economics, party-political ideology, government austerity measures, histories of legislation and council policy, contractual agreements, consultation agenda, failures of democratic processes, or histories of technical invention that organise how Lambeth works with information. Furthermore, the demands of my home and work life, technical skills, and educational and social background all mediate my work with the lookup_tables to ensure Lambeth enacts repairs. This complexity of associations means that each time I attempt to write about the lookup_tables, my understanding of them, and the information they contain, has typically changed.

I found it impossible to describe the lookup_tables and all their associations, which mirrored problems I had in describing HARMS, though with one crucial difference. I could observe almost all the components of the lookup_tables as I worked with them. Here,the concept of a technical object was central in comprehending the lookup_tables and Lambeth's databases as, to borrow from Simondon (2016, p.18), a space of perpetual invention. This invention continually produces new data, views, forms, calculations, documents, and other associations that make it a herculean task to trace how housing data has come into existence or contest its accuracy or validity.

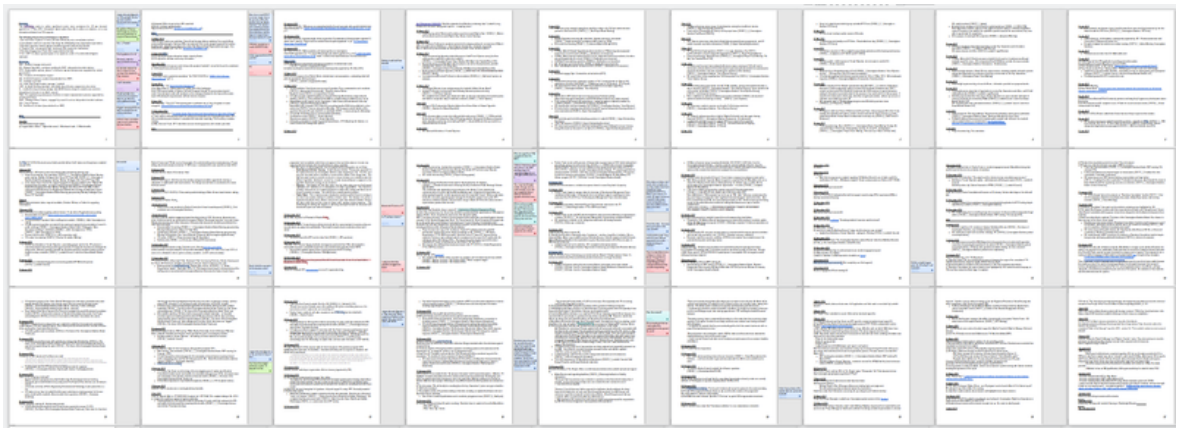


Figure 55. *Pages from a private* Judicial Review *timeline. This document was collaboratively written by Cressingham activists and contains comments in the margins.*

I considered the lookup_table as art and technical objects to avoid a definitive description of what they are and instead underline the scale of residents' engagement with Lambeth's technical bureaucracy. As art objects, screenshots and fold-out sheets paint a portrait of what it is like to engage with a continually changing field of relations. This scale is evidenced by the twenty-seven pages of @SaveCressingham's private Consultation Timeline (see fig. 55.), twenty pages of my Personal Timeline, @SaveCressinghams' 600+ archived of documents, and the length of fold-out sheets in this thesis. Crucially, it is not necessary to understand every list item's history to gain a sense of how power operates on Cressingham and I am aware that these lists are partial and will contain errors and misunderstandings. Instead, the lookup_tables communicate how power emerges from all directions, is visceral, and is understood and experienced as residents attempt to cope with and develop strategies against ineffectual repairs, democratic and legal processes, and calculations of demolition and rebuild.

Figure 56. *Selection of pages from my personal timeline of Cressingham repairs issues.*

Power relations on Cressingham are evident in residents' obsessive documentation of times, dates, and descriptions of repairs, consultations, and other events. This behaviour has been disciplined into us through years of dealing with constantly changing staff, technical systems, and form-filling exercises that shape future socio-technical strategies of repairs and regeneration. Residents experience changes in Lambeth's systems as subtle phase-shifts (Simondon, 2016, p.173) in how Lambeth

manages repairs. Changes in the workforce and a reluctance to authorise repairs, new consultation events and a sense that Lambeth is not maintaining buildings and environment, and closed local housing offices point to ever-increasing centralisation of housing services and hint at strategic changes within local and national government that can be difficult to pinpoint. The lookup_tables, therefore, are a way to navigate and expose a field of relations.

Creating screenshots of the lookup_tables (see figures fig. 56. and fig. 55.) points to the ethical and intrapersonal implications of Lambeth's databases, which maintain atmospheres, emotions, and memories, a phrase I borrow from Hui's (2016, p.57) discussion of digital objects' human impact. The illegible text within the screenshots, for example, reflects my unease with sharing personal information, ongoing resident and activist strategies, or concerns over transgressing data protection laws and my academic ethical commitments. My anxiety is also recognisable as flickers of embarrassment and feelings of frustration, disempowerment, anger at the water damage to my home, fear over unfolding legal action, and nights of insomnia caused by worry over the enormity of consultations. One Cressingham resident summarised this atmosphere: "Dealing with Lambeth's repairs service is traumatic. Each time I try and look at stuff, it feels like PTSD."

While working with lookup_tables in the Rotunda (see [fig. 52.), a self-declared working-class council tenant and a key contributor to @SaveCressingham pointed out spelling and grammatical mistakes due to my dyslexia. My mistakes and work location decentred my status as an academic working in a design department (see fig. 57.), and opened space to discuss their father's cabinetry work on pipe organs with *programming boards* preceding digital technologies. The discussion reminded me of another with the same resident who stated that "Lambeth assume I don't have a brain because all they see is a fat working-class white bloke" which points to a disdain − by councillors and housing and regeneration officers − that many residents report when dealing with Lambeth's bureaucracy. This atmosphere of disdain, I argue, is perpetuated by technical systems that marginalise residents experiences and knowledge in favour of systematised processes.

Figure 57. *My desk in Goldsmiths Department of Design.*

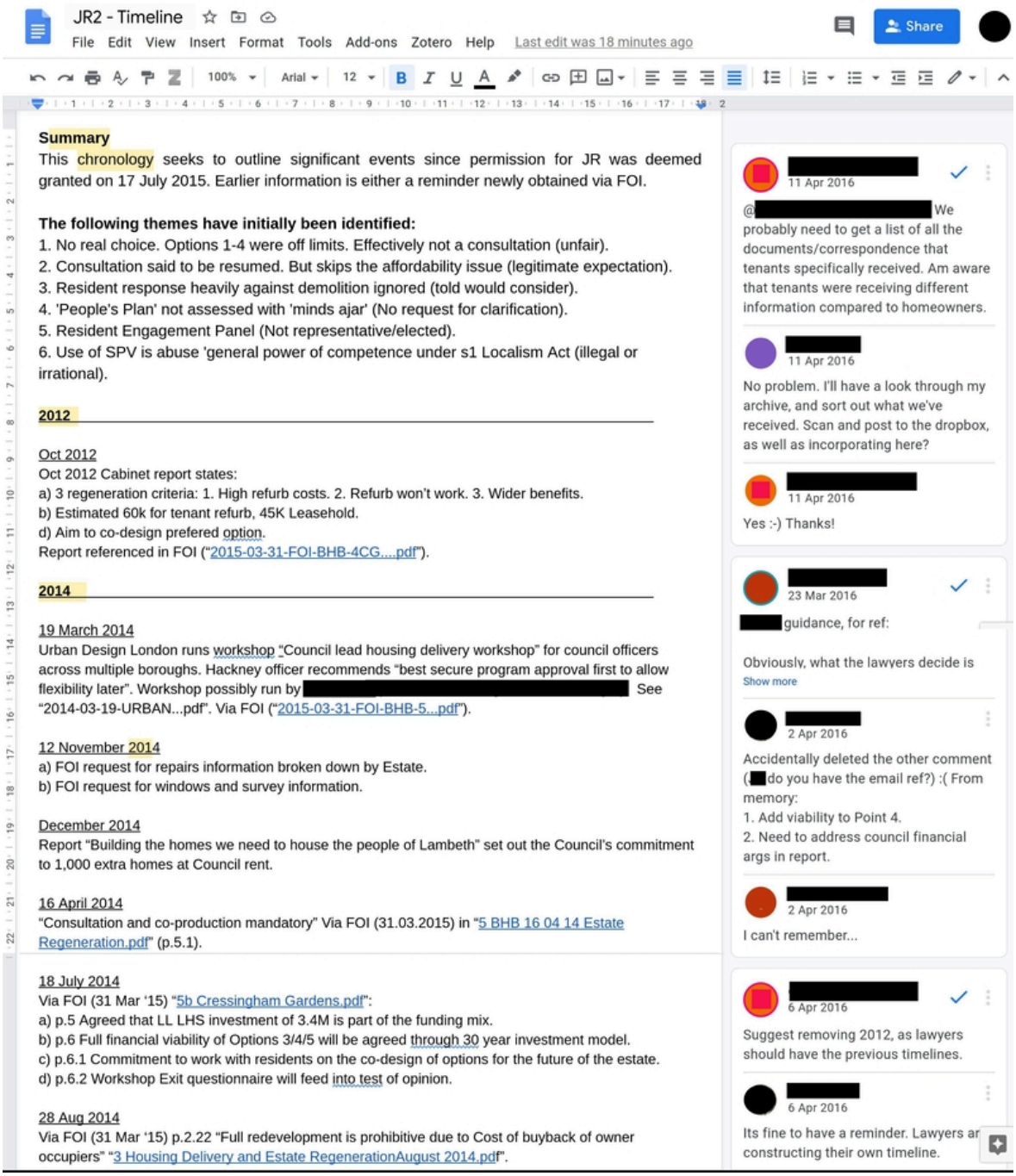


Figure 58. *Extract from a Google Doc version of a lookup_table. Incorporates annotations from activists.*

[redacted]

14 Dec '17 (6 months ago)

to [redacted] Hide deta Lambeth Reply to All More

From: [redacted]

To: [redacted]

Cc: [redacted]

Subject: RE: [redacted] - update

Date: Thursday, 14 December 2017 2:48 PM

Size: 1.3 MB

Hi [redacted]

We have received the quote for zinc and this was priced and £25k plus approximately £4k scaffold / temporary roof / tin hat. See attached

Morrison have also provided costs *below* for the GRP option. This material is a glass reinforced plastic which is extremely durable and something we have been using in Lambeth for the past 2 or 3 years. The expected lifespan of GRP usually exceeds 30 years. See diagram below for a typical GRP roof configuration.

Zinc was previously used in the past but since then the estate has obviously been identified for regeneration. In March 2016, the Council's Cabinet approved the complete redevelopment of Cressingham Gardens to deliver better homes for current residents and more homes to help tackle the housing crisis. A development management team has been selected and will soon start working with residents on the master plan for the rebuilt estate. Our decision to use GRP is based on this and if this was not the case we would have no doubt opted to replace in Zinc.

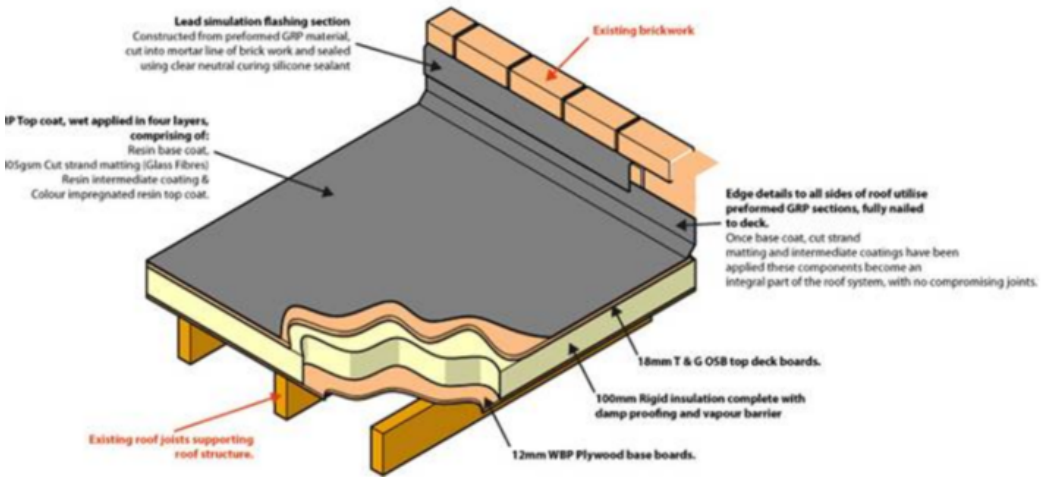


Figure 59. *Email from a Lambeth housing officer. Proposes the replacement of a zinc roof with inferior glass reinforced plastic.*

Technical objects and power

I employed the title *lookup_tables* as a reminder of the intersections of humans and databases in Lambeth. I derived the title from the computer science concept of a *lookup table*, which reduces computational load or storage by creating an index. In Lambeth, a database lookup table can store the results of a complex SQL query that take seconds to execute so that subsequent queries can return the same results in milliseconds − a technique I utilise and discuss in chapter six. The lookup_tables perform a similar function because they reduce cognitive and physical load so that I do not have to physically re-type internet searches, remember the entire content of documents, or search through hundreds of emails when responding to Lambeth. As such, through Simondon's concept of a technical object, I now analyse the lookup_tables in comparison tp Lambeth's databases as a meams to explore optimisations of governance and control.

The lookup_tables evolved through different modes of existence to forge particular kinds of social and technical relations. Examining these relations identifies an interplay between technical characteristics, aspirations to organise data, and configurations of control. Modes of existence of the lookup_tables included pencil and paper lists that allow me to rub out, correct, and re-order list entities − though this is slow work and restricts my ability to collaborate with others. DOC and DOCX file formats accelerate how I can create, read, update, or delete entities − though activists quickly lose track of file versions as we send files back and forth via email. Collaboratively edited lists within online Google Documents addresses *version control* issues by maintaining a single source of data, while introducing decisions over who is permitted to edit list-data and concerns over Google's corporate infrastructure. Google Documents stores list-data in a separate location from where activists work with it, which is a fundamental characteristic of the relational model − this is no surprise because a Google Document can be understood as a GUI to an underlying database system.

```
#### 2014 14th/15th Feb
- 22.15 Heard roof blowing off. Rang lambeth living to say there was emergency
and roof was blowing off. Told operator, roof was not repaired properly at xmas
during storm before xmas day. Got cut off.
- 22.30 lambeth living rang back. Got cut off so rang back again.
- 22.40 Explained that it's an emergency and person on other end does not seem
to compute what an emergency is. Explained my wife is due to gove birth!!!
Called fire brigade
- 22.45 fire brigade arrived.
- 23:10 LL Person called and told Morrison's person would be there with the
next two hours & more likely 1 hour.
- 23:49 LL Rang back and given job number: 1345203/1
Told Morrison's person would be there within the next two hours.
 - 1am roofer arrives and adds my own clamps to the roof as they didn't have
 anything suitable to deal with the issue.
```

Figure 60. *Extract from my Personal Timeline of repairs issues. Written using markdown formatted text with a loosely standardised date-naming convention.*

I converted and merged paper notes, DOCX files, and Google Documents into markdown-formatted text, a plain text format that focuses on text structure rather than its aesthetic layout. The markdown version of the lookup_tables allowed me to write code, which I titled "db," to automatically transform markdown text into multiple formats including PDFs and DOCX versions to send to journalists, activists, and others, as well as HTML to publish on my documentation website and scalable vector graphics that I used to print the fold-out sheets in this thesis (see fig. 61.). Therefore, the abstractions of code imparted lookup_tables with a live status, allowing me to continue to work with them as simultaneous activist and academic tools without manually synchronising multiple lists.

```
# Generate print guides
genmarkers () {
  M="<path
    style=\"opacity:1;fill:none;fill-opacity:1;stroke:#000000;
    stroke-width:0.3;stroke-miterlimit:4;
    stroke-dasharray:0.26334223, 0.79002669;
    stroke-dashoffset:0;stroke-opacity:1;
    paint-order:stroke fill markers\"
    d=\"m 1113.5197,YPOS h -15.1181\"
    inkscape:connector-curvature=\"0\" />"
    # m 1127.5197
  M=$(sed "s|YPOS|$1|g" <<< $M)
  echo $M
}
```

Figure 61. *Extract of lookup_table code that generates visual markers for the page folds.*

In writing the lookup_table code and publishing system, I realised that my markdown system was comparable to a relational database system. The markdown files are a data-store. The db code is equivalent to an SQL query because it allows the filtering and structuring of underlying data for specific outputs. Finally, the PDFs, DOCX, SVGs, and fold-out sheets are comparable to external views of data prepared for different individuals, institutions, and processes – such as central government requirements for data transparency that only show narrow aspects of any data-set. By comparing Lambeth's databases, I could comprehend and illustrate how their systems' abstract layers are continually productive of new views of data, calculations, and associations that are near-instantaneously out of date. The political implications of this are that by the time residents decipher how a view of data has come into being, new data, calculations, technologies, processes, and strategies may well have come into existence.

I was intrigued by what maintains (I use the present tense here because I continue to add to the lookup_tables) the live and continually productive status of the lookup_tables. This question be-

came a way to think with Simondon's concept of technicity to notice how every mode of existence of the lookup_tables shares a TIMESTAMP (time or date) and TEXT (freeform text) that are comparable data-types within a relational database table. Data-types are recognisable within the informal pencil and paper lists to standardised markdown-formatted text (see fig. 62.) involving a **TIMESTAMP** and TEXT description separated by a space and followed by two carriage returns. This standardisation allows my "$ db lookup_table 1" command to repeatedly generate static views of the live markdown dataset in the form of PDF's and other static document types that, to echo Simondon (2016, p.17) sacrifice possibilities of action. Through this combination of technical and theoretical work, I was able to connect the lookup_tables and Lambeth's databases with histories of standardisation, abstraction, and optimisation. In doing so, I could recognise abstract technical components, for instance data-types, as controlling and political forces on Cressingham, which is a theme I take up in the following chapter.

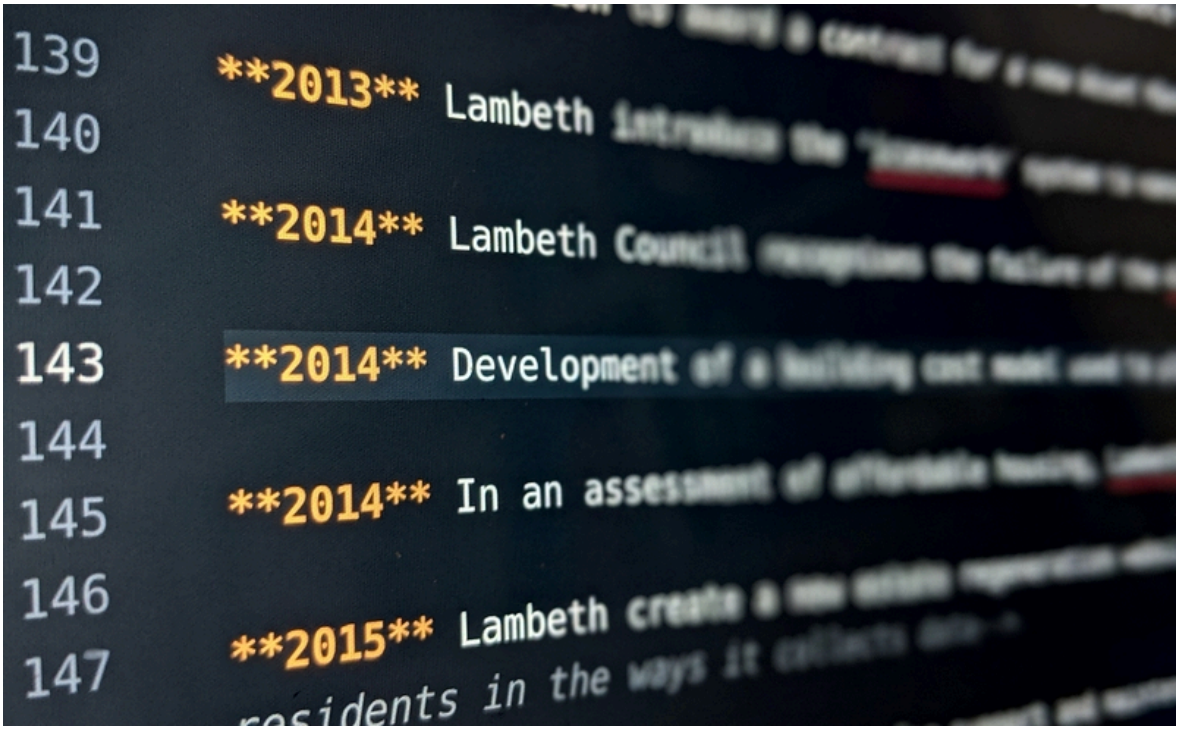


Figure 62. *Date and text entries written in markdown with numbers lines of text.*

The logics and controls of database machinery are blind to their human implications. As an illustration, I considered creating an entire relational database system to aid activists' preparation of timelines and lists. Doing so required that I enforce control over activists' input of text and dates. Such controls are necessary because humans cannot be trusted to systematically follow naming and text conventions as highlighted by my failed attempts to ensure @SaveCressingham contributors followed a consistent naming convention for files (see fig. 63.). I was aware, however, that if I introduced a GUI, a database schema, data-store, and dependencies on myself as a programmer, this would restrict and slow down the efforts of @SaveCressingham activists amid a legal battle.

My recognition of the ways in which a database system might slow down efforts was surprising

when considering that databases are intended to drive optimisation. In Lambeth, a comparable slow-down is evident in their slow responses, their ignoring of residents' complaints, and their seeming inability to oversee effective repairs. As a prominent @SaveCressingham activist commented, "Diseconomies of scale plague Lambeth." This activist, who has a background in corporate finance, referred to Lambeth's lack of oversight within large-scale housing management contracts that involve self-regulation and a lack of quality control while simultaneously limiting residents' abilities to enforce oversight. Arguably, these issues emerge with the particular configurations of Lambeth's technical systems as much as they do from any commercial or political agenda.

Multiple logics and discourses

My use of the term aspiration in relation to Foucault's concept of discourse articulates power as multiple aspirations that operate through Lambeth's database machinery. These aspirations are recognisable within human-machine discourses that impart authority to Lambeth's databases and the views and calculations that come out of them. Human discourses are evident within the lookup_tables as procurement reports, party-political public relations exercises, social media (see fig. 64.), cabinet reports, minutes of meetings, maintenance contracts, tenancy agreements, and other council documents. The disciplines of accounting, architecture, surveying, law, and more surround these discourses to reverberate through legislation, building standards, and policies that impact residents and buildings. Machine discourse is evident within network protocol, codes, file types, housing statistics, names of databases, and software modules that combine multiple database systems into fragmented wholes. Therefore, the ledgers and documents that emerge within this discourse exhibit both content and infrastructure that enables Lambeth to act in particular ways.

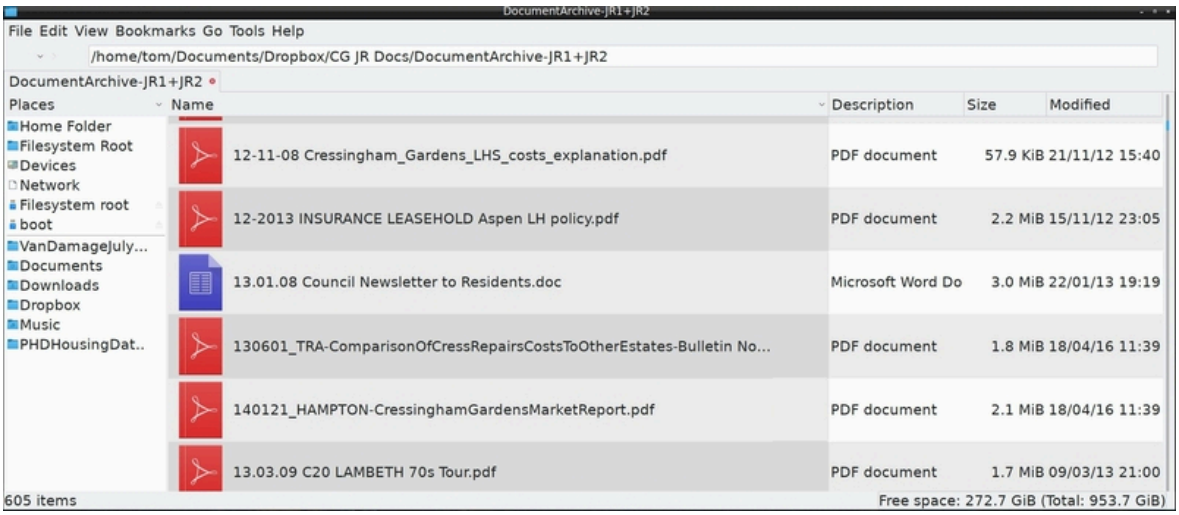


Figure 63. *Naming conventions to organise files.*

Living on Cressingham necessitates participating in government as an information system that strips away control and complexity. The moment that information flows into Lambeth's machinery, resident lose control. Algorithmic logics exercise these controls as a product of government and technical aspirations for efficiency and the optimisation of homes and buildings that has led to disrepair

and proposals for demolition on Cressingham. Accordingly, Lambeth draws from discourses surrounding housing data and databases to create a cage or funnel around democratic events to produce specific outcomes. For residents, these outcomes have all the appearances of pre-determined decisions in which participation is automated, disciplined, and controlled from the outset – words I take from Kitchins' (2017, p.15) analysis of the societal impact of algorithms. My point here is that residents' concerns are subsumed or ignored with standardised and automated processes that have little effect on democratic outcomes.

Figure 64. *Response to a Lambeth Labour councillor on Twitter. Contests the validity of waiting list figures and proposals to demolish a section of Central Hill estate in Lambeth.*

Lambeth's self-defined status as a co-operative council suggests that residents' controls over information should be a necessary mode of democratic participation. However, it seems inconceivable that residents could be assigned the ability to edit, annotate, or insert data. While Lambeth's councillors might argue that such controls would eradicate the authority or truth of such data, this stance would underline that data are more accountable to a local party-political system − with a current 90% Labour Party councillor majority − than to residents.

As a closing word in this section, I want to highlight Jardine's (1977) proceedings of a working conference to define the relational model. In these proceedings, Howard Morgan (1977, p.157) proposed a societal view of a database system that was never technically implemented. Morgan argued that a society should be able to examine how and by whom data was entered, updated, and used to avoid its potential harms. Accordingly, I came to understand the lookup_tables as a societal view of Lambeth's databases, in which residents can only infer existing, historical, and emergent housing technologies, practices, data, and data-structures. This limited view contributes to a technical politics and ethics of urban regeneration on Cressingham.

REGENERATION CONSULTATION RESISTANCE

1963 November First compulsory purchase orders in preparation for building Crossingham.

1967 March Design of Crossingham started.

1969 January Housing committee approved Crossingham's design.

1971 February Carlton Contractors chosen after the tender process.

1971 May Work started on site.

1978 September Handover of final blocks and first residents move in.

2012 July Lambeth's regeneration team met with the Crossingham Residents Association to discuss repairs issues and concerns. Soon after these initial meetings, Crossingham was the first estate to be included within Lambeth's borough-wide regeneration programme. Lambeth Officers informed the Residents Association that the estate suffered from major structural issues and that the council did not have funds for repairs. In response, the Residents Association pushed Lambeth for an estate-wide survey after committee members complained over finance and repairs data. The survey revealed minor structural problems and poor maintenance were the primary cause of repairs issues across the estate .

2012 Lambeth's press office stated that "People living in Crossingham Gardens will have a unique opportunity to decide the future of their estate" , which aimed to engage with, listen to, and work with Lambeth residents to develop solutions to problems such as housing. Despite these intentions, the lived experience of Lambeth's consultation by residents was anything but cooperative.

2012 September Lambeth held an exhibition on Crossingham, stating that there are not enough funds in the Housing Revenue Account (HRA) to refurbish the estate.

2013 November Lambeth published a draft survey undertaken by Tall Engineers and pushed for by residents. The report identifies that the most significant problems on the estate are due to poor repairs and maintenance rather than structural issues.

2014 Lambeth produced two estimates for the refurbishment of Crossingham, one by an external consultant and another by Lambeth Living, the council's Arms Length Management Organisation (ALMO). Both, coincidentally, came to £15.5m. A surveyor living near Crossingham worked with the @SaveCrossingham campaign to estimate that refurbishment would cost £6.95m. This resident-led survey caused regeneration officers to reduce their estimate to £9.4m.

2014 May Members of the Crossingham Residents Association initiated inquiries with the Department for Communities and Local Government (DCLG) regarding their Right To Manage repairs on the estate and their Right To Transfer ownership from Lambeth to a resident lead management organisation. The DCLG approved residents proposal to explore transfer and management options which led residents to tender for, and appoint, a lead advisor.

2014 May Lambeth Labour .

2014 May The grounds of the Crossingham consultation shift, due to the Lambeth Labour Party manifesto, where officers now aspire to construct additional homes on the estate. Frustrated with the change of focus and lack of a clear plan, the Residents Association devised and presented a project plan to Lambeth's regeneration team, which they appeared to adopt.

2014 November A regeneration consultation document issued to all residents by the council. This document introduces five options: Option one: Refurbishing the estate and bringing all council tenant homes up to decent homes standard. Options two and three: Refurbish and build additional homes. Option four: Partial demolition and build additional homes. Option five: Full demolition and rebuilding of the estate.

2014 November Residents report that the council refuses to supply 'Job Numbers' to residents when they report repairs which means they cannot chase or monitor the progress of repairs.

2014 November Following pressure from the Residents Association, housing officers agree to run a series of finance, green refurbishment, and resident-led management workshops, led by external consultants, for residents. The workshops (supposedly) informed officers final decision over the future of Crossingham though residents feel the workshops are just for show.

2014 December UK government agrees that Crossingham residents can 'explore the options' for the Right to Manage and Right to Transfer ownership of the estate. UK government also provide initial funds to engage an advisor.

Feb 2015 Lambeths Tenant Management team reluctantly state that they will support residents' applications for Right to Manage Cressingham.

2015 February Lambeth's Cabinet member for housing, Matthew Bennett, announced the council had removed refurbishment options 1-3 from the consultation. Officers had previously informed residents that complete demolition was unaffordable.

2015 March Cabinet members approved Bennett's decision to remove options from the consultation.

2015 April Residents appoint 'Open Communities' as lead advisor to explore Right to Manage and Right to Transfer options.

2015 May Lambeth refused to sign a funding application to help residents explore the Right to Manage process.

2015 July Cabinet members approve a proposal to demolish the entire estate. This decision ignored a July 2015 resident-led survey that indicated 86% of residents who responded (72% of residents) wanted refurbishment, with only 4% favouring demolition.

2015 July Residents instigated a Judicial Review into Lambeth's demolition decision, arguing (amongst other points) that Lambeth had not provided proof that refurbishment was unaffordable.

Jul 2015 Residents were granted permission by the courts to pursue judicial review.

July 2015 Lambeth finally signed the funding application to aid exploration of the Right to Manage process.

2015 November Judge Mrs Justice Laing in issues her judgement and quashes Lambeth's March and July decisions to demolish Cressingham. Lambeth chooses not to appeal the decision to, instead, re-consult with residents on the full range of options 1-5.

2016 January Lambeth commenced a new consultation that residents described as "tickbox exercise and shotgun consultation" because of the limited time provided for resident feedback and input. For example, officers delivered highly complex and incomplete financial viability information days before a consultation deadline, even though they promised the information for more than a year.

2016 March Cressingham residents met to vote on (and approved) proposals to serve notice on Lambeth for both the Right To Manage and Right To Transfer Cressingham. Residents approved both options because the future of Cressingham was unclear and because of concerns that the council would remove legislative rights from tenants that would prevent similar action in the future.

2016 March Cressingham residents responded to the 'shotgun consultation' in the form of The People's Plan . The plan proposed a fully costed and affordable refurbishment, with an additional 37 homes at current rent levels. Residents and campaigners collaboratively produced the document through close work with an architectural firm, a quantity surveyor, financial and legal expertise, a journalist, green retrofit experts, technology and community arts professionals. Residents also devised the Peoples plan through workshops, door knocking exercises, and exhibitions.

2016 March Lambeth rejected proposals outlined in The Peoples Plan for a £9 million refurbishment with more council-owned homes than those proposed within Lambeth's report. In comparison, Lambeth estimates that their demolition and rebuild of Cressingham would cost around £110 million, funded by high-value private sales and rents and involving their Special Purpose Financial Vehicle Homes For Lambeth (HFL). HFL is a complex arrangement of private companies tasked with financing and delivering Lambeth's regeneration programme that operates outside the restrictions of local authority legislation. Lambeth's estimates include costs for the buy-back of properties from homeowners, compensation to displaced residents, and top of the expenses for demolition and rebuild.

2016 May Residents garner support from the only Green Party ward councillor in Lambeth who has the authority to 'call-in' Lambeth's March 2016 cabinet decision (to demolish Cressingham) for further scrutiny. However, the scrutiny committee does not 'send the decision back to the cabinet for further consideration.

2016 May Campaigners prepare for a second Judicial review into Lambeth's decision to demolish Cressingham.

2016 May After much delay and contestation, Lambeth accept residents' Right to Manage notice.

2016 June Despite a pending judicial review, Lambeth begins a re-tendering process for a development management team for the regeneration of Cressingham with an interview and selection process involving members of the Lambeth-led 'Cressingham Resident Engagement Panel' which is highly contested by residents.

2016 August The High Court rules that Cressingham residents have a case for a second judicial review into Lambeth's second decision to demolish Cressingham. A consequence of this ruling is that Lambeth is not permitted to do anything irreversible to Cressingham and cannot rely on any subsequent actions to argue that they have made concrete commitments to move forward with redevelopment.

2016 April Lambeth release a summary dashboard of their 30-year Housing Revenue Account (HRA) business plan. The business plan indicates that the HRA position does not recover over 30 years, but rather, annually goes further and further into the red with a total net loss, by year 30, of -£194m. For an unknown reason, the HRA appears to be bankrupt by 2019/20 which is unlawful. Notably, the UK government debt cap (which prevented Lambeth from borrowing to fund the HRA) is no longer an issue, with £52m free debt capacity available at the lowest point.

2016 September Lambeth submitted an objection, to Cressingham's Right to Transfer notice, with the Secretary of State. Residents write a response to the Secretary of State and wait for a final decision.

2016 November Consultation deadline for Lambeth's 'key guarantees' to tenants and homeowners facing regeneration. These guarantees outline what residents should expect to happen after displacement from their homes.

2016 November @savecressingham argue five grounds for the second Judicial review: 1. Lambeth had erroneously included a £7.5m loan (classified as a grant or loan in different sections of financial models) that falsely adjusted NPV calculations to make the scheme appear financially viable. 2. Lambeth Officers misled Cabinet members about The Peoples Plan. 3. Lambeth had failed to provide Cressingham residents with up-to-date data relating to Lambeth finances. 4. Lambeth's proposal to remove tenants Right to Buy was contrary to current government policy under Article 1, Protocol 1 of the European Convention on Human Rights.

2016 December Mayor of London, Sadik Khan, published a draft good practice guide to regeneration which housing campaigners widely criticise.

2016 December The @savecressingham campaign lost their second Judicial Review , which means Lambeth's decision to demolish Cressingham still stands. However, residents continued to pursue both Right To Manage and Right To Transfer options for Cressingham as poor quality repairs and maintenance continue to be a significant issue on the estate.

2018 February Residents learn that Lambeth will provide HFL with a £300m public loan with no details of how they will pay back the loan to the public purse. Begs the question of why Lambeth cannot provide money for an environmentally-friendly refurbishment?

2017 March End of the Mayor's second round of consultation on estate regeneration. 95% of respondents support ballots for residents facing regeneration.

2017 July Cressingham Gardens Estate phase one and phase two were approved in the Greater London Authority Open Projects System.

2017 September Labour leader Jeremy Corbyn announces a policy of 'ballots for residents' facing regeneration during his Labour conference speech.

2017 November Lambeth appoint multidisciplinary consultant Mott Macdonald to lead the development of the Cressingham, working with architect Conran and Partners.

2018 February Mayor of London, Sadik Khan, launches a good practice guide for estate regeneration in London titled Better Homes for Local People. The report supports the principle of mandatory ballots for residents as part of estate regeneration schemes.

2018 February Leader of Lambeth, Lib Peck, announces that Cressingham Gardens will be exempt from a resident Ballot as plans for regeneration are too far progressed. Campaigners argue that Lambeth has not produced a master plan or single architectural drawing for any proposed new development.

2018 February UK government assess Cressingham residents ability to manage the estate. The (as yet unpublished) report fully supports the resident application for the Right to Manage.

2018 March Cressingham residents discover that the London Mayor may have rushed through funding to redevelop Cressingham and other estates ahead of the recommendation for estate ballots. Thus funding-stream may allow Lambeth to avoid balloting Cressingham residents.

2018 July Green party councillors in Lambeth propose a motion that all residents of estates facing regeneration be given a ballot over the future of their homes. Labour party cabinet members reject this motion.

2018 October Cressingham residents request to make a deputation, representing all estates facing regeneration, at a full Lambeth cabinet meeting. Lambeth rejects this request.

2019 June Residents register Cressingham Gardens Resident Management Community Interest Company (CGRMC). This company aims to take over responsibility for repairs (under £5,000), anti-social behaviour issues, car parks, and estate cleaning services from Lambeth.

2019 July The secretary of state approves the @SaveCressingham application for the Right To Transfer ownership of the estate into community hands. Lambeth issue a press release stating they intend to go ahead with regeneration.

2019 July A Lambeth representative contacted a contributor to @SaveCressingham to ask if Cressingham residents still want to proceed with the Right To Transfer application .

2019 July A Greater London Authority policy advisor provides information regarding a feasibility study stage, as set out in Part 3 of the Regulations, to develop Cressingham's plan for the Right To Transfer.

2019 September At a Residents Association annual general meeting, residents agree to dissolve the Residents Association in favour of the CGRMC with a board of directors and separate community committee.

2020 Jan Lambeth signed a joint agreement with all ten housing associations operating in the borough to coordinate housing services between 2020 to 202. The plan applies to the 26,000 councils managed homes and a further 24,000 homes managed by housing associations. Unclear what the implications might be for Cressingham (see https://love.lambeth.gov.uk/lambeth-housing-partnership).

2020 Feb The UK Government Treasury increases the Public Works Loan Board (PWLB) interest rate by one percentage point from 1.8% to 2.8%. The move seems intended to discourage councils from borrowing to fund multimillion property investments (see https://www.thebureauinvestigates.com/stories/2019-10-11/interest-hike-for-council-loans-could-stop-regeneration).

2020 Feb Letter sent to Cressingham residents. "Lambeth plans to build new homes on the edge of Cressingham Gardens on the Trinity Road side". The plans are for twenty new homes comprising 13 at council level rent and seven as shared ownership. Lambeth provides no details of the location in the letter. Residents are nervous, so ask for further information and discover Lambeth aspires to demolish 11 existing homes on Ropers Walk (facing Trinity Rise), including one leasehold property and the rest temporary tenants or are empty. There is no planning application as yet. A council representative also mentioned that Lambeth would finalise their master plan for Cressingham over the summer.

2020 Feb Labour MP Bell Ribeiro Addy states her support of the @SaveCressingham campaign and later invites campaigners for a meeting at Portcullis house. Members of Constituency Labour Party groups in Lambeth are also more vocal in their support of Cressingham and other estates under threat of demolition.

2020 June Lambeth released their accounts which show the council has built three new houses in the year and purchased sixty-one properties on regeneration estates for around £71m. Notably, none of these purchased properties is being used as council properties because HFL rents them on the private market.

2020 Dec Lambeth submitted a planning application to demolish a section of Crossingham Gardens using the Christmas period to limit resident critique. The council notified residents of roads neighbouring the estate but did not notify Cressingham residents.

2020 Dec Lambeth sent a newsletter to residents stating they are in the process of submitting a planning application for the 'Trinity Rise' development even though they had already applied.

2021_Feb Lambeth councillors voted (6 to 1) to approve a 20 apartment redevelopment of 12 homes on Cressingham Gardens at Ropers Walk (described as the Trinity Rise development). The demolition will result in the eviction of an 83-year-old retired NHS nurse who has lived on Cressingham for over thirty-three years. The application received 395 objections and just two comments in favour.

2021_Jul @SaveCressingham prepare grounds for a third judicial review into the Trinity Rise development, variously arguing that the council sought to 'salami-slice' the estate by securing approval for piecemeal demolitions and that the council had not considered the heritage implications of the scheme.

2021_Jul The high court granted permission for @SaveCressingham's judicial review. Rather than argue their case in court, Lambeth quashed their planning application to demolish Ropers Walk.

2021_Oct Lambeth resubmit a planning application to demolish Roper Walk, which planning officers grant for the second time.

Figure 65. *Fold-out: Timeline of Lambeth's consultation with residents and subsequent acts of resistance.*

Conclusion

In working with the Impossible Code/Diagram, Lambeth's decisions calendar, and the lookup_tables, I identified Northgate and Keystone as key databases within Lambeth's housing management practices. I also discovered a mass of technological names, processes, locations, humans, telephone system, software modules, standards, organisations, and other components associated with Lambeth's housing services. I struggled to make sense of these associations within a diagram, the formal structures of code, or a technical description. This struggle echoed mine and other residents difficulties in comprehending or obtaining information about Cressingham and Lambeth's housing practices and technologies. Accordingly, I identified Lambeth's databases as part of socio-technical collectives mediated by abstract, material, and human components that render certain things visible, invisible, or too complex to articulate or comprehend.

Through these research activities, I identified methods with which to meet the demands of simultaneous academic, technical, activist, and personal endeavours. In doing so, I was able grasp technical objects and their associations at a specific instance of engaging with them. The lookup_tables were particularly critical in my identification of Lambeth's databases as optimisations of human and machine efforts. In doing so, I argued that Lambeth's databases carry and enact human aspirations documented in legislative, local government, and technical discourses. Crucially, these technical aspirations are concerned with the standardised and rapid flow of data through a network, which generates a disassociation between Lambeth, residents, the ways in which homes and lives are represented, and the emotional impact of that disassociation. As such, I observed how standardisation, enacted through and with the relational model, distributes accountability while simultaneously instantiating controls over information, residents, and workers alike.

I came to recognise the lookup_tables as a live diagram or societal view of HARMS involving multiple socio-technical trajectories that are impossible to fully articulate. Therefore, in working with the lookup_tables I could observe the evolutionary status of databases in Lambeth by comparing them to everyday lists − from paper lists, digital documents, and the fold-out sheets of this thesis − that I amassed as part of personal, academic, and activist work. Consequentially, my work with the lookup_tables validated and developed my theoretical and methodological approach while also supporting activist endeavours.

Chapter 5.
Abstract Objects

Introduction

This chapter provides examples of how I figure abstract technical objects that emerge with Lambeth's databases to operate through people's lives, homes, and spaces on Cressingham. In section one, *Abstract technical objects on Cressingham*, I take Simondon's (1958) concept of an abstract technical object (see chapter two) and develop it in relation to Hui's (2016) theorisation of a digital object, and Jardine's (1977) definition of the conceptual layer of the relational model. Through sections two to four I then discuss and analyse three intersecting research activities. *Service Charge Parser* involved a resident-led audit of homeowner service charge statements and writing code that altered power and knowledge relations between residents and Lambeth. *SOR codes, Paper Houses, and a Search Drill* involved a workshop within a public performance that materialised hidden codes that underpin every Repairs Job. *Spreadsheet Schema* was a resident-led effort to comprehend the vocabulary of database schemas in Lambeth and the ways they organise Lambeth's housing services.

My analysis identifies how abstract technical objects − such as a *Service Charge Statement, Repairs Job*, and *Schedule of Rates codes* − emerge from the relational model as domains of action, power, and knowledge. I discuss how these objects organise and distribute labour practices and accountability within Lambeth while carrying the potential to work both for and against residents' concerns. I argue, therefore, that changes to these objects and their associations can bring about meaningful democratic change by reconfiguring residents' access and control over data-structures, not just data. Through this analysis, I make the following key points: abstract objects form individual relations that undermine the possibility of collective action; database terms can produce an indifference to long-term maintenance and planning; and databases enact a formal logic that is invisibly infused with the strategic aspirations of government and commerce.

Abstract technical objects on Cressingham

Simondon's concept of an abstract technical object articulates how technical objects unlock potentials in material and social relations. For Simondian, an abstract technical object is a formative stage in a technical object as it evolves into a concretised, optimised, form that has resolved internal and external relations. He argues that these can be theoretical, material, human, environmental, economic or more. For example, Simondon introduces the contemporary combustion engine (as of the 1950s) as an example of a concretised object that has resolved internal and external relations involving: theories of thermodynamics; material characteristics and form; production-line process; locations of manufacture; modes of distribution; and the economics of building and selling an engine. He (2016,xv) argues that this resolution means that a concretised object cannot be anything but itself − because any change to internal or external relations will result in a different kind of object. In contrast, he argues that an abstract technical object is open to new possibilities and associations because it is not yet fully optimised.

Figure 66. *Montages of Cressingham incorporating historical and technical quotations. Top image shows the Lambeth Archives website with a picture of Cressingham. Bottom image multiplies an image taken from advertising literature. Published with permission of Lambeth Archives.*

Simondon variously refers to an abstract technical object as: a system of isolated partial ways of functioning (2016,xv); an object that presents technical problems (ibid,p.27); the physical translation of an intellectual system (ibid,xv,49); a technical state that precedes invention (ibid,74); and an object thought by an engineer (ibid,105). These definitions open consideration of abstract technical objects on Cressingham as a mediation between human, technical, material, environmental, legislative, and other relations that continually mould their existence. The activities discussed in this chapter, therefore, draw from Simondon's theorisation to explore a politics that results from this mediation. For instance, I identify in the following section how Service Charge Statements enact Lambeth's contractual obligations to residents while also producing asymmetries of knowledge between different categories of tenancy.

Simondon's concept of an abstract technical object can be problematic when applied to a Service Charge Statement or Repairs Job because they exhibit characteristics of both abstract and concretised objects. For example, these objects can be understood as concretised because they are optimised to flow through hardware, software, network infrastructures, and postal systems as a resolution of work practices in Lambeth; the environment of a housing estate; different modes of communication between residents and Lambeth; legislation; and controls over contractor, tenancy and homeowner agreements. Service Charge Statements and Repairs Jobs are also abstract because they translate abstract representation into material action; are productive of new associations, such as resident-led repairs audits; and are subject to constant mediation as an integral function of Lambeth's housing management systems.

Hui's (2016, p.2) concept of a digital object addresses the blurred abstract and concretised status of abstract technical objects in Lambeth, though I stick with the term *abstract technical object* to describe such objects on Cressingham. Hui identifies YouTube videos, Facebook profiles, and HTML pages as digital objects that are driving forces in the production of new socio-technical arrangements. He presents these objects as data and meta-data (data describing data) that are optimised to be distributed and multiplied through computational networks while still recognisable as individual objects. However, a Lambeth Repairs Job is not as contained as a video or HTML file because it is much more diffuse. A Repairs Job is comprised of residents' aspirations in seeking a repair; the meta-data of a database schema; aspirations of local and national housing policy; the actions of surveyors, contractors, finance staff, and politicians; GUIs displaying the different aspects of a job; and multiple paper, PDF, and other documents that represent individual Repairs Jobs in different manner. I find the term digital, therefore, too limiting to describe modes of existence that are not always reducible to the digital.

Lambeth's database schemas operate within the conceptual layer of the relational model and are thus implicated within the politics of repairs and regeneration. Such schemas are a site where aspirations of national government, local government, and commerce for council-owned housing are

translated into data structures that model homes, residents, workers, and actions. Beatrice Yormark (1977, p.13), a representative of the Rand Corporation within a working conference on database management systems, writes that a database schema is a real world view or model of how a business does its work, which explicitly identifies a database as a domain of abstract and material action. Furthermore, in his examination of collectivity and poltics Jason Read (2005, p.114) draws from Simondon to discuss how society is organised around abstract objects that constitute subjects of political concern through structures of language and power. These technical and philosophical resources add to my argument that abstract technical objects instantiate real-world controls over workers, buildings and residents on Cressingham.

As I undertook the activities discussed in the following sections, I constructed images (see fig. 66.) as a way to comprehend abstract objects, philosophical concepts, and technical thought that may seem removed from residents' experience of repairs. Further, making these images, and indeed the Search Drill contraption discussed later in this chapter, was a way to escape the depressing drudgery of living through regeneration and fighting against administrative systems that feel optimised to produce poor-quality repairs. The top image identifies residents as components of largely invisible information systems that have emerged from histories of computation. The bottom image acts a reminder that computation produces outcomes outside of human intent. These images have very much shaped my research activities as I figured how abstract technical objects discriminate between different categories of residents and expose hidden logics within the accelerations and optimisations of Lambeth's database machinery.

Service Charge Parser

The following section analyses Service Charge Statements (SCS) as material manifestations of an abstract technical object produced by HARMS. Here, I discuss a homeowner-led audit of repairs on Cressingham where we Almost Workshopped (see chapter three) our SCSs. This audit led me to program the *Service Charge Parser*, which is software that utilised computer vision techniques to transform paper and PDF documents into Comma Separated Value (CSV) files. This transformation, of an abstract technical object into another form supported residents' efforts to contest over £127,000 worth of Repairs Jobs on Cressingham. Through these activities, I observed how database vocabularies work to discriminate against council tenants while presenting possibilities of changing relations of power and knowledge between Lambeth and residents.

A typical Repairs Job might involve a resident telephoning Lambeth's call centre to report a leaking window. Day, weeks, or even months later, a contractor might appear, frequently without notice, to address the issue. If the repair is not effective, residents re-report the issue, which may result in an alteration to an existing Repairs Job and discussions with surveyors, housing officers, and the regen-

eration department. Up to a year later, homeowners receive a statement in the post from Lambeth's finance department listing all repairs (see fig. 70.). The data presented within a SCS, however, is a sub-set of the data held by Lambeth and contractors, which includes records of resident-telephone calls, emails to contractors and between Lambeth's workers, and contractors' own database and technical systems. For residents, it is unclear how (or if) these and other data structures fully represent communications between Lambeth and residents, between Lambeth and contractors, or between Lambeth's departments and workers. As such, many residents email Lambeth a summary of any encounters they have with the repairs service to generate a resident-controlled ledger of events. As an abstract technical object, therefore, a Repairs Job is fragmented and diffuse because it involves activities that are not always represented by data structures in HARMS; are distributed across multiple technical systems; and is operationalised in different ways by Lambeth, residents, and contractors.

The activity

For many years on Cressingham, I, like most other homeowners, paid my SCSs without question. The charges *felt* credible, so we did not notice the details. However, as repairs costs started to rise and the quality of repairs decreased, we paid more attention to costs. Residents can be said to have felt a Simondian phase-shift (see chapter two) in HARMS as it transformed from an apparatus of repair to one of disrepair and demolition.

In January of 2016, I organised a meeting of Cressingham leaseholders in my home to review and audit our SCSs (see fig. 67.). We read through our statements over a cup of tea and slice of home made cake while discussing how Lambeth managed repairs. In doing so, we highlighted over £40,000 worth of contested repairs that rose to £127,000 in subsequent meetings and audits. The primary motivation of this meeting was to ensure that we incurred reasonable charges for good-quality repairs and improved public areas of Cressingham as well as the homes of our neighbours. The audit resulted in a list of contested repairs; evidence of housing mismanagement; evolved strategies of dealing with Lambeth; a strengthened informal resident network; and the transformation of a tedious administrative task into an enjoyable social event. This in-home audit was a contrast to dealing with repairs issues alone, which had led to feelings of isolation and futility.

At the first of these now annual meetings, we invited a non-resident quantity surveyor who explained how to recognise common mistakes in data and tactics by contractors to inflate repairs costs. With these new skills we identified Repairs Jobs that lacked sufficient detail to warrant payment; were not completed; we suspected had been double charged; or should have been claimed on insurance. These issues prompted us to review past statements and undertake, where possible, a physical inspection of all listed Repairs Jobs.

Figure 67. *Service Charge Meetup. Feb 2016*

Parsing the technical and social

The act of parsing a SCS is a process of deciphering database vocabulary, data, as well as human-machine actions that the data represents. In computing terms, to parse something is to analyse text into logical syntactic elements. Reading my statement, therefore, it is an act of breaking it down so that the processes and components that created it can more easily be understood. In Simondian terms, parsing a SCS is a process through which residents comprehend its genesis, associations, and ongoing existence. The outcome of this parsing is that it reveals potentials to alter power and knowledge relations between Lambeth, residents, and contractors.

To draw from Fuller (2007, p.66), a SCS exists within a media ecology that encourages conformity towards a set of presets that blinker possibilities of thought or action. In other words, residents' statements point to a set and course of actions that are difficult to deviate from. This ecology is recognisable as the abstract primitives of tables, data-types, and primary keys that crystallise into the familiar, at least to the technically inclined, relational database management systems such as SQL Server, Oracle, MySQL, or MariaDB, or Microsoft Access − each of which are aligned with different development practices and associated politics of closed-source or FLOSS software. These individual systems then evolve and conform into commercial housing and finance databases such as Northgate and Oracle E-Business that are structured around vocabularies of finance and housing management. Lambeth then installs − or, at least, pays consultants to install − Northgate and other databases that they configure to model and enact their specific housing practices within the UK

legislative domain. Recognition of this ecology reveals a SCS as a concretisation of computer hardware, software, commerce, legislation, and cultures of commerce, technology, and government that bear down on residents' lives.

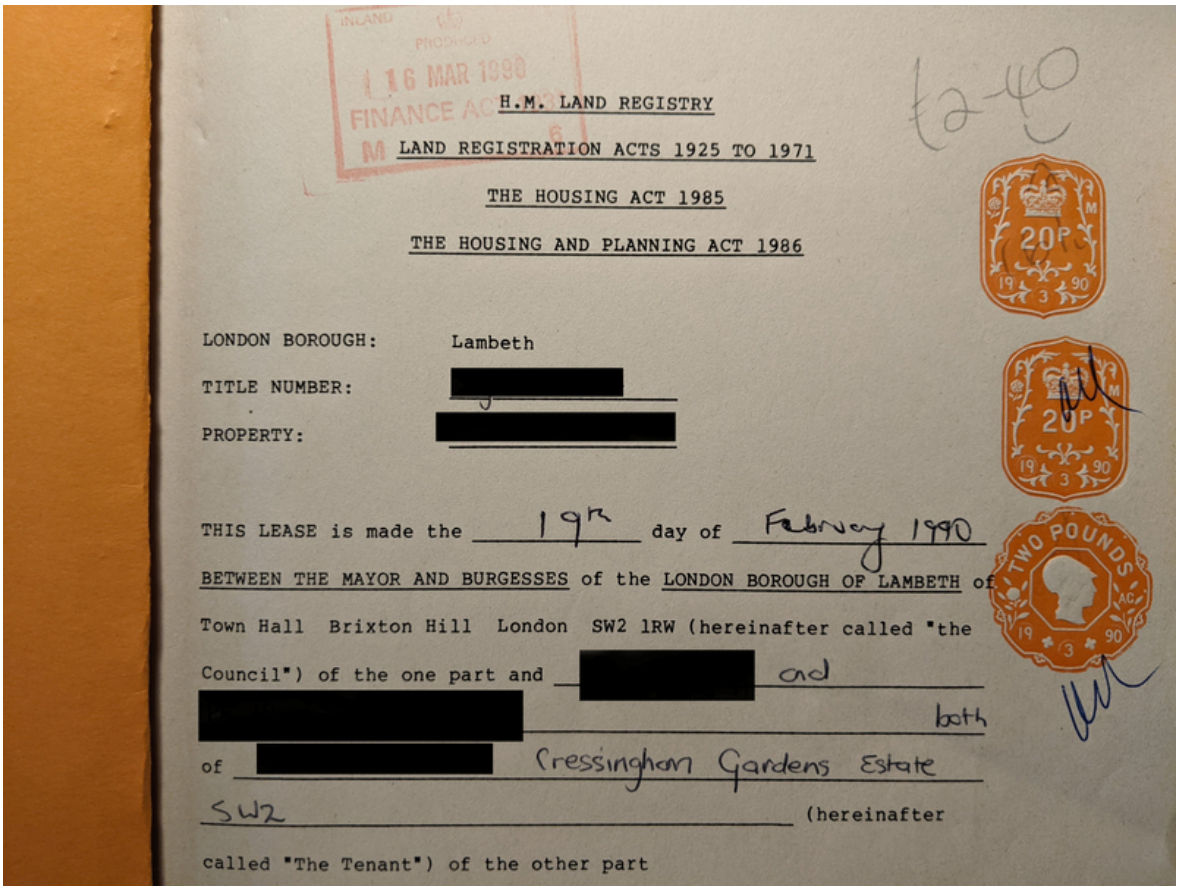
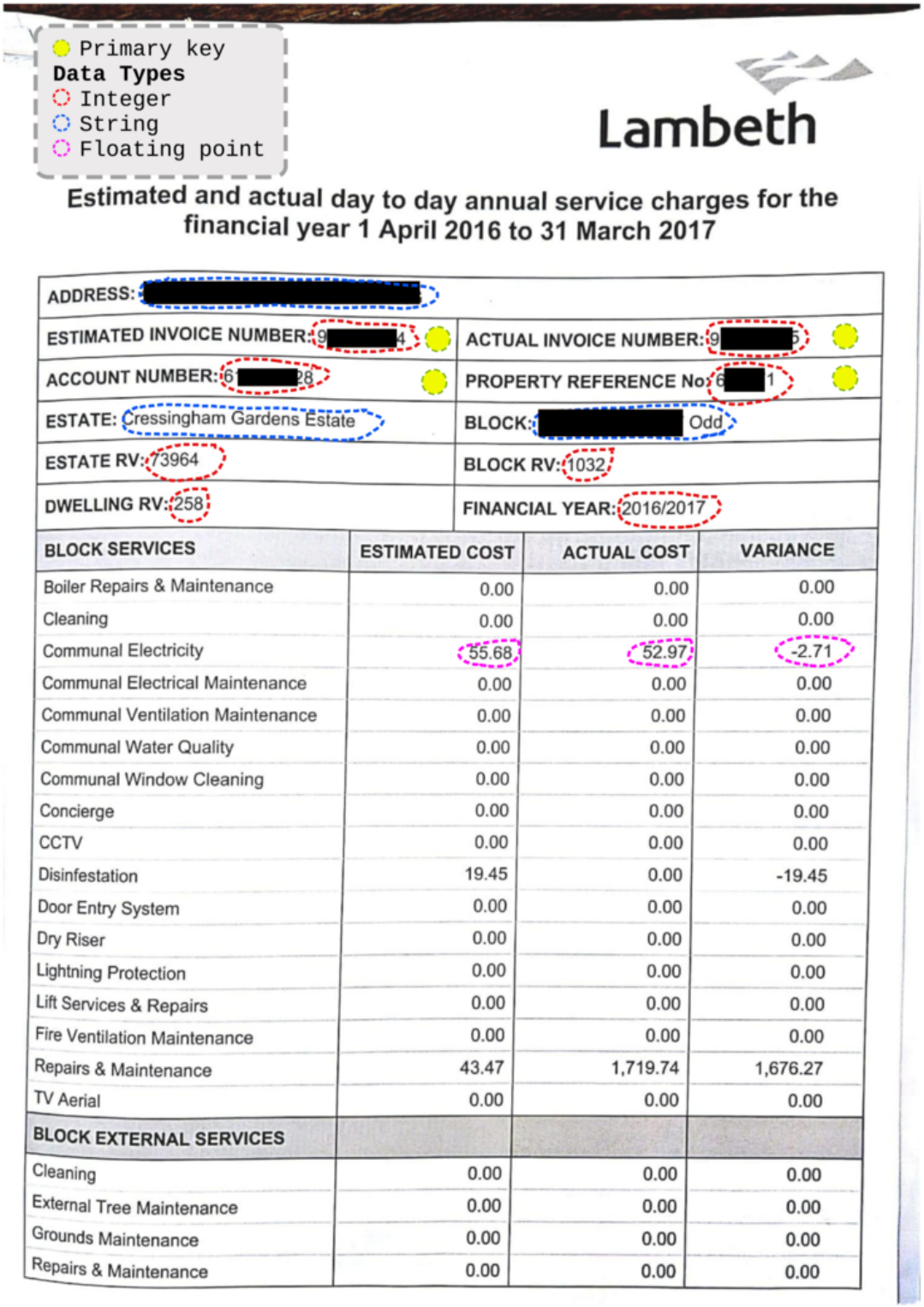


Figure 68. *Extract from my leasehold agreement supplied by Lambeth after digitising their archive.*

A Repairs Job is an exercise, or mode of governance, focused on the production and maintenance of institutional truths (see chapter two) rather than the maintenance of homes. As one of these truths, SCSs are a process of materialising relations between data-entities, calculations, databases, Repairs Jobs, humans, homes, and institutions of government. Constituting these relations, through my annual statement, therefore, is the materialisation and enactment of my leasehold agreement with Lambeth (see fig. 68.). Ledgers and calculations of transactions define my obligations to pay a *reasonable share* of costs associated with categories of repairs, homes, blocks, and public areas of Cressingham. These obligations are underpinned by UK land registration and housing acts, introduced between 1925 and 1986, that impart Lambeth with the authority to request money from homeowners under threat of legal action. However, Lambeth's complaints process typically ignores residents concerns that the truth of any SCS is unreasonable. Accordingly, data-structures, modes of distribution, and controls that surround a SCS leave homes on Cressingham to fall into disrepair, as evidenced by a Housing Ombudsman investigation into Lambeth's failing housing complaints process (Cuffe, 2021). The challenge for residents, therefore, is to alter the ongoing existence of a SCS towards different outcomes.



BLOCK SERVICES	ESTIMATED COST	ACTUAL COST	VARIANCE
Boiler Repairs & Maintenance	0.00	0.00	0.00
Cleaning	0.00	0.00	0.00
Communal Electricity	55.68	52.97	-2.71
Communal Electrical Maintenance	0.00	0.00	0.00
Communal Ventilation Maintenance	0.00	0.00	0.00
Communal Water Quality	0.00	0.00	0.00
Communal Window Cleaning	0.00	0.00	0.00
Concierge	0.00	0.00	0.00
CCTV	0.00	0.00	0.00
Disinfestation	19.45	0.00	-19.45
Door Entry System	0.00	0.00	0.00
Dry Riser	0.00	0.00	0.00
Lightning Protection	0.00	0.00	0.00
Lift Services & Repairs	0.00	0.00	0.00
Fire Ventilation Maintenance	0.00	0.00	0.00
Repairs & Maintenance	43.47	1,719.74	1,676.27
TV Aerial	0.00	0.00	0.00
BLOCK EXTERNAL SERVICES			
Cleaning	0.00	0.00	0.00
External Tree Maintenance	0.00	0.00	0.00
Grounds Maintenance	0.00	0.00	0.00
Repairs & Maintenance	0.00	0.00	0.00

Figure 69. *Scan from my service charge statement. The coloured annotation indicates data-types and primary keys.*

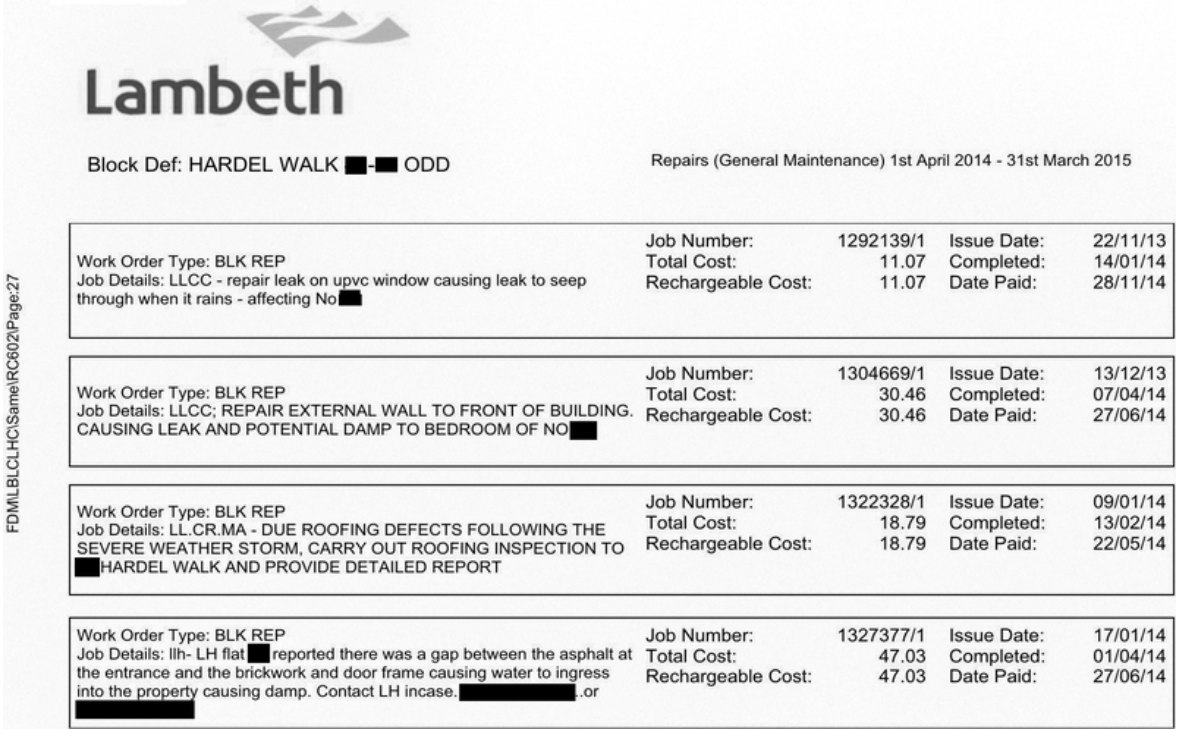
It would be remiss not to draw comparison between my annual SCS and Foucault's concept of the statement (see chapter two). Stripping a SCS of its data and leaving just metadata exposes abstract machinery involved in the regulation, distribution, and circulation of Lambeth-derived truths − of Repairs Jobs, cleaning, electricity, and other housing services. However, it is important to remember that Foucault dealt with paper-based discourse rather than database technologies that introduce additional dynamics of power and knowledge. Lambeth's contractors and telephone operators, for example, cannot comprehend all the processes and decision-making associated with a Repairs Job. This is because repairs are enacted within database systems that produce partial, and often inexpert, instructions for jobs that are out-of-sight of decision-makers. While this system may be *good enough* for a majority of smaller repairs, such as a broken tap or repointing a wall, it is unable to cope with more complex demands of, say, a roofing issue. As such, housing databases can be observed to produce complex layers of administration between residents, Lambeth workers, and contractors that can be impossible to fathom. Such complexity was clearly not the intended outcome of Lambeth's repairs service though their database systems have produced such an outcome.

Accountability and labour

Parsing the database vocabulary of a SCS involves comprehending lines of accountability in order to effect change. The summary page of my 2016/2017 SCS (see fig. 70.) displays *ESTATE*, *ESTIMATED INVOICE NUMBER*, *PROPERTY REFERENCE No*, *ACCOUNT NUMBER*, *BLOCK* and other terms. Further terms are displayed in Repairs Jobs, listed in later pages (see fig. 70.), that are consistently organised by *Job Number*, *Work Order Type*, *Job Details*, *Issue Date*, *Completed*, *Total cost*, and *Rechargeable Cost* within black-lined boxes. These visible data-relations are accompanied by hidden relations between call operators, contractors, sub-contractors, surveyors, lawyers, councillors, and other humans who, may or may not have influenced the existence of a Repairs Job or be represented by a data entity. However, because data entities do not represent all their social and technical associations, it is impossible to determine exactly how a Repairs Job has come into existence, which restricts residents' abilities to contest or destabilise the truth of a statement.

The artist and theorist Frances Hunger (2018, p.62) articulates a database as a discourse and infrastructure for the recording, extraction and production of data and meta-data. Hunger argues that this discourse leads to a situation in which nobody can be held accountable. However, my work with residents' SCSs adds more nuance to Hunger's argument because the structuring and distribution of a SCS provides the precise mechanism to hold Lambeth to account through unique references to Repairs Jobs, invoices, and statements. The meta-data structure of a Repairs Job and its legislative milieu, for instance, makes it possible for a contractor to request payment from Lambeth and for Lambeth to request payment from residents. As such, issues of accountability, regarding day-to-day repairs do not primarily concern who is responsible as this is undeniably Lambeth. Complex layers of administration, contractors, and subcontractors should not matter to residents, even if Lambeth seems unable to monitor and enforce those contractual relationships. Instead, issues of Lambeth's

accountability arise from the resident-effort required to contest each repair and the economic viability and time taken for individual legal action. Here, the term *individual* is key because Repairs Jobs and other abstract technical objects are a process of creating relations between Lambeth and individual residents which subjects them to controls that limit the possibilities of collective action.



Lambeth

Block Def: HARDEL WALK [redacted]-[redacted] ODD

Repairs (General Maintenance) 1st April 2014 - 31st March 2015

FDM\LBLCLHC\Same\RC602\Page:27

Work Order Type: BLK REP Job Details: LLCC - repair leak on upvc window causing leak to seep through when it rains - affecting No[redacted]	Job Number: Total Cost: Rechargeable Cost:	1292139/1 11.07 11.07	Issue Date: Completed: Date Paid:	22/11/13 14/01/14 28/11/14
Work Order Type: BLK REP Job Details: LLCC; REPAIR EXTERNAL WALL TO FRONT OF BUILDING. CAUSING LEAK AND POTENTIAL DAMP TO BEDROOM OF NO[redacted]	Job Number: Total Cost: Rechargeable Cost:	1304669/1 30.46 30.46	Issue Date: Completed: Date Paid:	13/12/13 07/04/14 27/06/14
Work Order Type: BLK REP Job Details: LL.CR.MA - DUE ROOFING DEFECTS FOLLOWING THE SEVERE WEATHER STORM, CARRY OUT ROOFING INSPECTION TO [redacted]HARDEL WALK AND PROVIDE DETAILED REPORT	Job Number: Total Cost: Rechargeable Cost:	1322328/1 18.79 18.79	Issue Date: Completed: Date Paid:	09/01/14 13/02/14 22/05/14
Work Order Type: BLK REP Job Details: llh- LH flat [redacted] reported there was a gap between the asphalt at the entrance and the brickwork and door frame causing water to ingress into the property causing damp. Contact LH incase.[redacted].or [redacted]	Job Number: Total Cost: Rechargeable Cost:	1327377/1 47.03 47.03	Issue Date: Completed: Date Paid:	17/01/14 01/04/14 27/06/14

Figure 70. *Detailed page from my service charge statement.*

I wrote the Service Charge Parser code to optimise activist work of auditing repairs, support a collective resident-endeavour, and explore database abstractions. The code transforms paper and PDF versions of SCSs and Repairs Jobs into a CSV file format. Written in the python programming language, the code converts PDF versions of SCSs into a series of Joint Photographic Experts Group (JPEG) images. I scanned each SCS page into a single PDF document or obtained a PDF via Lambeth − which often took a week or more. I converted text into images because PDF's do not structure tabular data in a predicable format like a spreadsheet, so data are not always easy to extract using code. The Service Charge Parser employed *Computer Vision* techniques to identify fields of data based on their consistent location and bounding-box on a page. An *Optical Character Recognition* function then machine-encoded these image-fields into strings of text. The code then combined these strings into a single line of text and appended them to a growing CSV file.

The process of transforming an abstract SCS and individual Repairs Jobs into a new predicable format seemed banal until I recognised that this transformation reconfigured how residents collectively dealt with Lambeth. Repairs Jobs carried latent potentials that were productive of a new socio-technical collective of code, residents, outside expertise of a quantify surveyor, and possibilities of legal action − all of which could question the authority of repairs data. A Repairs Job

controlled and distributed by Lambeth defines individual relations between residents and Lambeth that puts limits on residents' knowledge and their ability to collectively act, whereas the abstractions of a Repairs Job allowed it to become a new more-than-technical construct that supported collective action.

```
# Calc Ratable value (set in the 1970s)
def ratablevalue(self, job):
  # Is the job valid?
  if self.maindata == {}:
    return job
  # Is RV over £250 then Lambeth should have sent a S20 notice
  X = float(job[6])
  ERV = int(self.maindata['estate_rate'])
  BRV = int(self.maindata['block_rate'])
  PRV = int(self.maindata['property_rate'])
  if job[0] == 'Block repair':
    rv = X/BRV*PRV # Your block contribution
    txt = '--'
  else:
    rv = X/ERV*PRV # Your estate contribution
    txt = '--'
  if rv > 250.00:
    txt = "ALERT!! Disputable item"
  job[7] = '{}'.format(round(rv, 2))
  job[8] = txt
  return job
```

Figure 71. *Extract from Service Charge Parser code. Identifies whether Lambeth have followed consultation and recharging policies for repairs.*

The Service Charge Parser code highlighted how abstract objects carry the potential to redistribute labour, power, and knowledge. Through automation, the code shifted the labour of auditing repairs back onto Lambeth resulting in a change of human conduct. For instance, it can take days of effort to copy tens of Job ID numbers, descriptions, and costs from SCSs to send to Lambeth as part of a complaint. Between 2013 and 2016, for example, my personal SCSs listed over 28 A4 pages (see fig. 70.) of individual Repairs Jobs. Employing code to transform these pages into a CSV format meant that residents could import data into spreadsheet software, manually add items to an ever-expanding list, perform instant calculations on costs, work via online spreadsheets, and easily divide the physical labour of auditing and inspecting repairs (see fig. 72.). The outcome

was that multiple residents submitted large lists of contested repairs to Lambeth, who were frozen into inaction for at least two years, as the accounts department − so I was told by a call operator − struggled to obtain information about specific repairs from the housing department and contractors.

Residents' attempts to change the status of a Repairs Job exposed a politics of local authority repairs that surrounds Repairs Job identification numbers. As one housing officer remarked, "a Job ID number is king" − a reflection of the bias of male contractors and housing officers on Cressingham. This offhand-remark identified the status of primary keys as the locus of a power struggle made visible through residents' attempts to force contractors, finance, complaints, and housing teams to delete or nullify a Repairs Job − through changes to a hidden database field somewhere − so as break its legal and financial association.

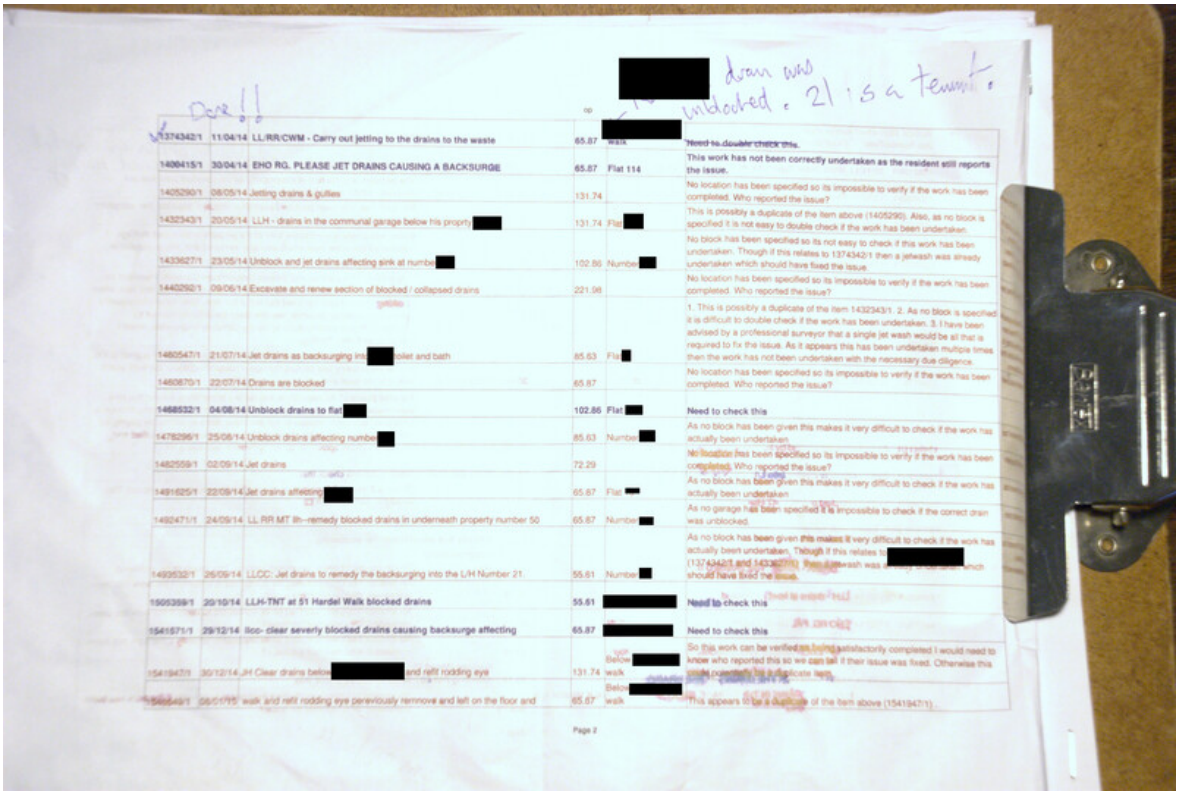


Figure 72. *Clip board with list of Repairs Jobs. Used for a physical audit of repairs on Cressingham.*

@SaveCressingham suspect that our Labour Party ward councillors offered little support in contesting Repairs Jobs due to Party Political diktat or manoeuvring (in Lambeth) that aspires for demolition and rebuild; and because they are not equipped to understand repairs. An ex-lambeth councillor I met at the UK Parliament's Portcullis House when presenting Cressingham's case to our local MP, for instance, stated that Cressingham was beyond repair which is not a view that is shared by professional surveyors, architects, and heritage organisations, such as The Twentieth Century Society (2015), who have support and contributed to @SaveCressingham. We also suspect that councillors lack the drive to follow up complaints and are aware they communicate inaccurate or unsubstan-

tiated information about Cressingham's structural condition. I argue, therefore that the political and technical structuring of Repairs Jobs and SCSs allows homes to rot within socio-technical processess that are near-impossible for residents act against on their own.

Discrimination through asymmetries of knowledge

Asymmetries of knowledge are created in the act of crafting and running SQL queries that go on to produce thousands of requests for payment from categories of residents every year. These requests take the form of SCSs, rental invoices, and other abstract objects that mediate communications between Lambeth and residents. These queries make subsets of data and meta-data visible to some, but not others. While this controlled visibility may seem to be necessity in managing contractual relations between Lambeth and the categories of Leaseholder, Freeholder, Secure Tenant, and Temporary Tenant, the result is that council tenants who tend to be from poorer socio-economic backgrounds are disadvantaged when it comes to public consultations over the refurbishment and demolition of homes. SQL queries in HARMS, therefore, can be observed to produce asymmetries of knowledge and power − to act against disrepair − as a form of discrimination.

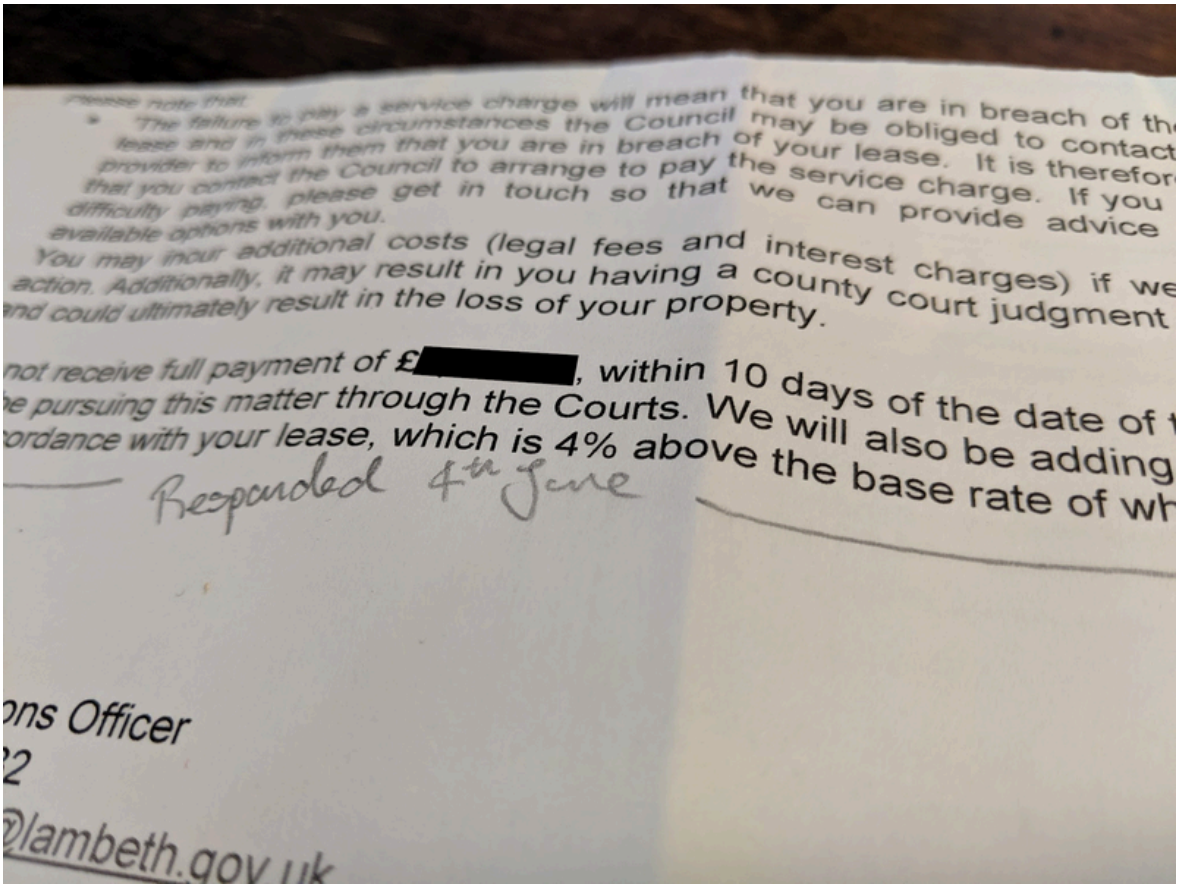


Figure 73. *Automated threat of legal action sent by Lambeth. Letter's like these ignore residents complaints over unreasonable charges for ineffectual works.*

While physically auditing repairs, I realised that tenants, unlike leaseholders, cannot audit repairs data. As I spoke to a tenant about a repair outside their home. The tenant informed me that they

do not receive itemised service charge statements because repairs costs are included in their rental payments. I also discovered that some categories of freehold homeowner do not have access to repairs data and metadata, and neither do private tenants who rent from homeowners.[1] Added to this, when I requested all repairs data for Cressingham from Lambeth as a member of the Residents Association, this and other requests were refused. Lambeth argued that my requests would contravene GDPR policy. These refusals and asymmetries of knowledge invite speculation on how all residents could equitably audit data whilst acknowledging the ethical concerns of sharing data − points I take up within my discussion of building the Shadow Database in chapter six.

Leasehold homeowners have privileged access to some, but not all, repairs data, which means that they are better-able to interrogate Lambeth's claims that Cressingham is too expensive to repair. Added to this, tenants are not able to view the meta-data terms of a SCS which limits their ability comprehend the internal and external relations of a Repairs Job. This means that tenants have less information and are thus less able to act against the worst effects of disrepair. In contrast, my access to repairs data and meta-data meant I could write the Service Charge Parser code and work with other residents to identify drain covers that were not replaced, walls that had not been repointed, and poor-quality drainage works. This activity opened possibilities of legal and other kinds of action in contesting repairs. These asymmetries of knowledge are particularly problematic when considering that Lambeth's proposals to demolish Cressingham affects all categories of resident and that a democratically elected Residents Association cannot represent or advocate for residents in the same way.

SOR codes and a Search Drill

This next section explores and analyses hidden codes in HARMS through a description and analysis of a research event and contraption. I developed a performance/workshop in an Army Surplus tent on Cressingham as a playful enquiry into the role of hidden Schedule of Rates (SOR) codes with a Repairs Job. I discovered SOR codes via a contractor working on Cressingham who remarked that he "just had to follow SOR and PR codes then do his best with a bad description." The contractor explained how an SOR code defines a base-cost and description for repairs and maintenance jobs and that PR codes (see fig. 82.) define the length of time a job should take. This conversation led to my submission of a FOIA request and access to a Lambeth spreadsheet listing 5,603 SOR codes (see fig. 78.) with descriptions and costs. The spreadsheet also contained twenty-nine acronyms, which took a further seven months to explain through discussions with housing officers and additional FOIA requests.

1 Lambeth may have accidentally sold freehold rights to the first wave of tenants enacting their Right to Buy, which introduced sub-categories of freeholder who pay a service charge and others who do not.

Figure 74. *Making paper houses as part of my performance/workshop. Image: Degenerate Space.*

Figure 75. *Performance by a young Cressingham resident. Image: Degenerate Space.*

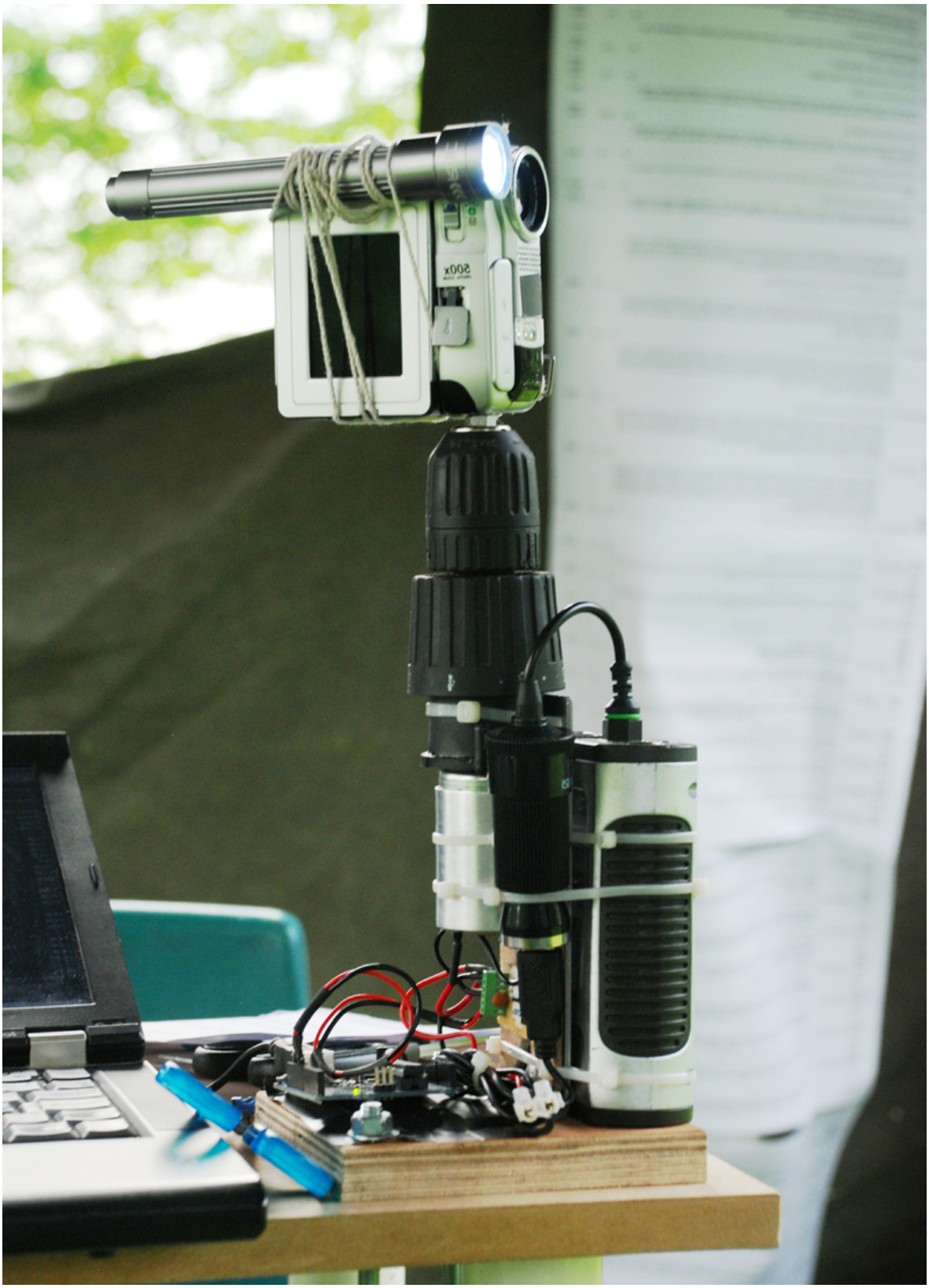


Figure 76. *Search Drill Device.*

Figure 77. *Stills from the Drill Search digital video. Showing residents, children, and visitors to the performance/workshop.*

Context and objects of the performance/workshop

My performance/workshop took place within a larger performance initiated by the theatre group *Degenerate Space* titled *The Smallness Inside the Bigness*. The title of the performance was derived from Cressingham's architect, Ted Hollamby, who sought to create an atmosphere on Cressingham in which people did not feel herded together (Dreams, 2014a). Over the course of a year, Degenerate Space got to know Cressingham residents and supported the @SaveCressingham campaign by attending protest events and key council decisions. The production comprised a montage of performances that took the audience across multiple sites and involved monologues spoken by residents (see fig. 75.), theatrical interventions, a short film screening, poetry, and my performance/workshop. Each performance explored different narratives relating to Lambeth's proposals to demolish Cressingham.

Over two days Cressingham residents, Degenerate Space helpers, and passers-by were involved in numerous activities including: constructing and decorating the tent with print-outs of SOR codes; making paper houses; configuring my Search Drill contraption (see fig. 76.); and searching for SOR codes using a command-line interface that I created for the event (see fig. 80.). Throughout the day and within the evening performances, I discussed with residents and visitors how hidden SOR codes affected Cressingham's buildings and residents. Each evening, I gave a short talk to an audience of around fifty, taught them to make paper houses, and introduced the Search Drill with its laptop interface.

The Search Drill was a crude database system in the form of a playful and barely-working improvised contraption. It was comprised of a drill mechanism that spun a camera and torch in response to a participants' search queries and recorded images as it spun round. The contraption consisted of a laptop, a text-based search interface, a 1990s mini digital video camera, a torch, micro-controller, battery, wooden stand, table, and human controllers.

Preparations for the performance and its enactment changed the social setting and feel of Cressingham. The strangeness of the Search Drill, along with its dysfunction and noise caused intrigue and encouraged residents and visitors to drift over to the tent. The Search Drill was in no way an efficient search tool. Rather, its function was, for a brief moment, to create a space in which the constructs that surround Lambeth's repairs service both melt away and become more visible − this was a playground rather than an administrative engagement. Children, most of whom I knew from Cressingham, were drawn to the device and became a catalyst for talking to their parents about their experience of ineffectual repairs, disorganisation, lack of care or concern over residents' lives, and the ways that SOR and other acronyms can unsettle and marginalise through their ambiguities. Other residents simply enjoyed the opportunity or moment to take ownership over the public spaces of Cressingham with the excuse of play.

Through the performance/workshop, I introduced SOR codes as elemental components of Repairs Jobs. I described how SQL queries ensure that SOR codes do not appear in SCSs or tenants' bills for rent and thus hide layers of information and complexity from residents. I also described how SOR codes are implicated in a £170 million maintenance contract between Lambeth and the large-scale maintenance company Morrisons − themselves acquired by the maintenance company Mears − who provide responsive repairs, refurbishment, estate management, decent homes work, and planned maintenance services in Lambeth (Lloyd, 2010). Central to my discussions throughout the two days were how SOR codes organise contractual obligations within Lambeth and workers, and how the invisibility of these codes makes it difficult for residents to comprehend repairs processes.

	A	B	C	D	E	F	G
1	MORRISON Sx3 Price						
2	Responsive Repairs						
3				Use Ctrl 'F' to find schedules			
4	Resp			2.0 Groundworks			
5	Resp						
6	Resp			2.1 Edgings, Paths and Steps			Minus 29.3%
7	Resp						SX3 Price
8	Resp	GRD001	PR4	EDGINGS:RENEW OR REBED PATH EDGING	LM	16.93	£11.96
9	Resp			Edging:Renew or rebed any timber, brick or pcc concrete edging, take up existing edging and haunching, remove waste and debris, clean up concrete bed and edging, relay and haunch both sides, point, formwork, make good to existing finishes.			
10	Resp						
11	Resp	GRD003	PR4	PATH:RENEW SECTION OF CONCRETE PATH	IT	162.56	£114.85
12	Resp			Path:Renew concrete path n.e. 3 metres long x ne 1 metre wide, thickness to match extg, break up concrete, exc., cart away, fill soft spots, compact, 150mm h/core bed, blinded, concrete smooth finish, all formwork, make good to existing finishes.			
13	Resp						
14	Resp	GRD005	PR4	PATH:RENEW SECTION OF MACADAM PATH	IT	107.84	£76.19
15	Resp			Path:Renew macadam path n.e 3 metres long x ne 1 metre wide, break out existing, cart away, fill soft spots, level, compact , fill soft spots, 75mm stone, 50mm base macadam, 20mm wearing course macadam, formwork, make good to existing finishes.			
16	Resp						
17	Resp	GRD007	PR4	FLAG:RENEW OR REBED PAVING FLAGS	IT	51.87	£36.65
18	Resp			Flag:Lift any pcc paving flag clean off and set to one side, fill and compact hardcore to soft spots and renew or rebed existing flag on 25mm bed of cement mortar (1:4) and point up joints. Up to 6 flags.			

Figure 78. *List of SOR codes obtained via FOI. Displays SOR codes such as* GRD001 *along with an associated description.*

Producing individuals and abstract controls

During the two-day event, my conversations with participants drew my attention to how residents' individual capacities and associations are integral to the existence of a Repairs Job. Here, Nina Lykke's (2010, p.164) feminist analysis of scientific and academic writing helps to articulate how my engagement with HARMS is not a bodyless, faceless, depersonalised, or de-contextualised position. Rather, my status as a homeowner undertaking PhD research with professional knowledge of computer programming and capacities in woodwork, brickwork, metalwork, plumbing, and electronics all influence how I report and initiate a repair. In contrast, a large proportion of residents I spoke with had minimal experience of further education, were not confident with computers, and did little household DIY. Indeed, I often helped both tenants and leaseholders with DIY tasks or lent

my tools for basic jobs − indicating, particularly on the part of tenants, a lack of trust in Lambeth's repairs. These discussions underlined that an individual's experience and background contribute to the way in which a resident is perceived and processed by the human and technical components of a Repairs-Job-as-process.

Figure 79. *A participant making paper houses.*

There is a disjuncture between categorisations of Repairs Jobs and their real-world enactment where, it is impossible for residents to determine whether human or technical factors have cause any failure. My own knowledge of SOR codes meant I could check for *the best* code to address a repair in the shortest time to influence a call operator in their categorisation of a repair. I initially perceived, though could not be sure of, a speedier and more accurate response to my own repairs. However, many resident-participants were dubious that access to these codes and descriptions would change much. As one tenant put it, "it doesn't matter how you report a repair, they will still fuck it up." Indeed, my optimism that knowledge of SOR codes would radically change repairs processes was extinguished with Lambeth's continued failure to address long-standing repairs issues on Cressingham and also to my own home.

Repairs Jobs can organise contractors towards the wrong output, which I argue is productive of institutional indifference. A passer-by commented that he often gets sent to the wrong job within his work for local authorities as a sub-contracted roofer. These issues are magnified, he explained, by Responsive Repairs, where the onus is on residents to describe and diagnose the root cause of a repairs issue. The contractor's mention of Responsive Repairs prompted my issuing of further

FOIA requests (Lambeth Borough Council, 2016c), through which I discovered that Lambeth had not had a *Planned* or *Cyclical Maintenance* programme in place on Cressingham since before 2016. Accordingly, the category of Responsive Repairs accelerates throughput of ineffectual repairs in addition to Lambeth's case for regeneration, while producing an indifference to long-term maintenance and planning. Accordingly, the metadata structure of a Repairs Job enables and performs different speeds and temporalities of repair that are set in favour of regeneration.

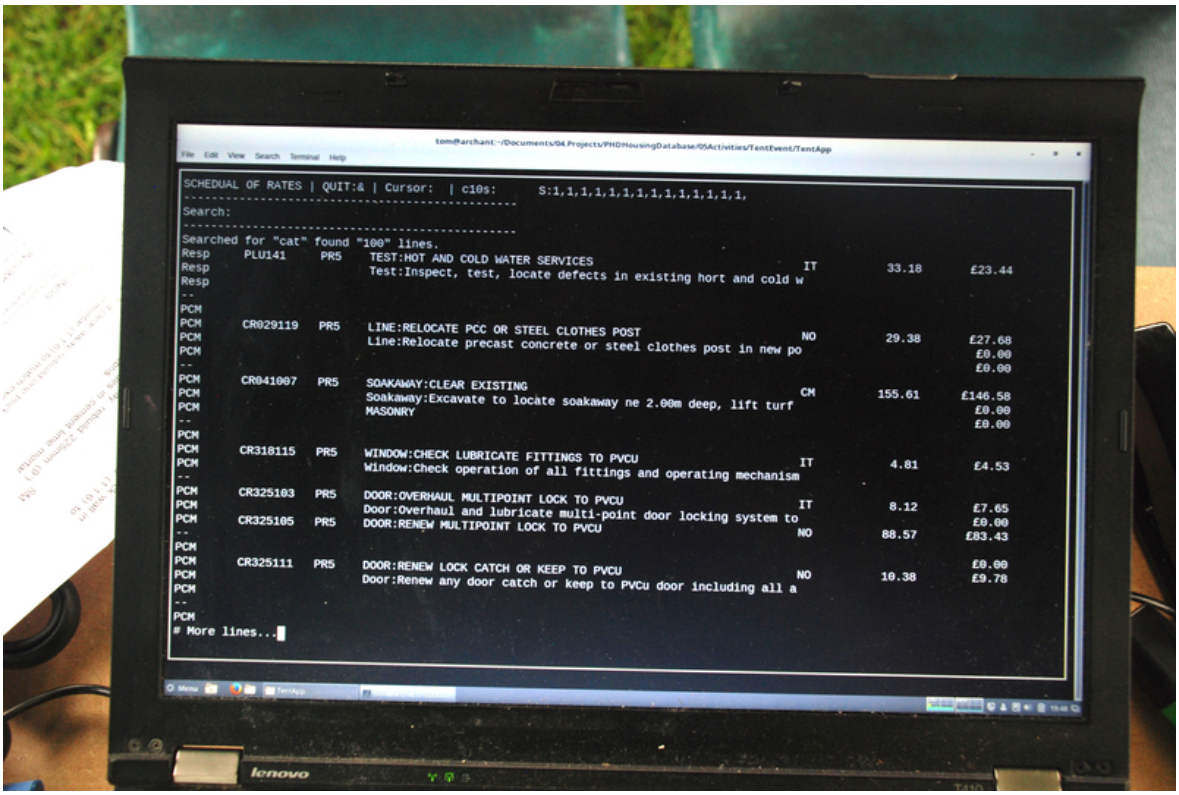


Figure 80. *Text based GUI of the Search Drill contraption.*

Given the above, HARMS can be understood to be structured within tightly defined grammars of action (Agre, 1994, p.109), a concept I discuss in chapter two, that limits residents' abilities to control the existence and lifespan of a Repairs Job. Here, the Search Drill brought questions of database control to the fore. The abstract status of the Search Drill meant it was open to possibility. I could easily attach a torch to deal with low light, adjust the height of the camera by inserting an aluminium extension-pole to the chuck of the drill, twist the camera by hand to capture an interesting image (see fig. 77.), or update code in response to how residents were using the contraption. In contrast, within HARMS, a Repairs Job prescribes compliance through its organisation of residents, call operators, surveyors, housing officers, and others who submit data and themselves to the grammars of SOR, PR, Responsive Repairs, and other acronyms and terms. As the metallurgist, research physicist and technological theorist Ursula Franklin (1990, p.16) proposes, technical practices that prescribe compliance exclude the possibility of immediate feedback and adjustment. A resident, after all, is not permitted to work with programmers to adjust the code or schema of a Lambeth database in response to their own needs.

Contractors and residents can be powerless in directing a Repairs Job because they must follow its formalised logic. Residents can only speculate on the ways in which call operators record and categorise a repair and contractors must perform the work they are instructed to do, even if they understand that an ad-hoc approach will not address underlying issues. Crucially, contractors and residents are not necessarily aware of strategic housing-management decisions or the socio-technical complexities of database-managed repairs practices. As one Lambeth surveyor commented, he was set to address long-standing repairs issues on Cressingham until political discussions around regeneration caused a change in strategy. SOR, PR, and other codes, therefore, enact a formal logic that is invisibly infused with the strategic aspirations of Lambeth, the UK government, and commercial agreements. The outcome on Cressingham is a culture of disrepair involving demoralised contractors who are prevented from fixing underlying repairs issues; workers who lose interest in performing quality work and/or learn poor repairs practices; inefficiencies and expense associate with ad-hoc repairs; and contractor-companies that profit from a high throughput of small Repairs Jobs.

Figure 81. *Making paper houses on Cressingham.*

```
# PRIORITY CODES
PR1 – Attend and repair within 24 hours
PR2 – Attend and repair within 3 working days
PR3 – Non-Urgent. Complete within 7 Days
PR4 – Routine repair. Completed within 28 Days
PR5 – Planned works. Complete within 90 days
```

Figure 82. *PR codes that determine how quickly a repair should be completed.*

Spreadsheet Schema

In the following section I discuss and analyse the *Spreadsheet Schema* (see fig. 86.), which provided a space to decode almost sixty acronyms and terms that structure Lambeth's repairs and maintenance services in a spreadsheet format. The Spreadsheet Schema emerged from my exploration of Service Charge Statements and SOR codes, was pivotal in creating the *Shadow Database* discussed in chapter six, and progressed residents' applications for the legislative Right to Manage (RTM) and Right to Transfer (RTT) Cressingham into community hands. I now introduce the activist and legislative context in which the Spreadsheet Schema emerged, then analyse its relationship with Lambeth's database schemas and the ways they mediate strategies of knowledge production, governance, and control.

My work with the Spreadsheet Schema invited questions including *how might alternative vocabulary instigate different kinds of action? How might residents control a Repairs Job to categorise them as void, incomplete, or of poor quality?* However, I realised the futility of attempting such changes through complaints (see fig. 83.), ward-council level democratic processes, or modes of tenant and homeowner consultation enacted by Lambeth. Further, I recognised that such questions are an academic luxury within a live activist campaign rushing to meet multiple government-set deadlines. As such, through this activity, I identified how database schemas introduce modes of resident action outside of government control, which questions the status of HARMS as an apparatus of total government control.

Human and legislative associations

The Spreadsheet Schema emerged within the *Cressingham Gardens residents Management CIC* (CGRMC), an organisation based on co-operative principles run by a diverse group of residents. The aim of CGRMC is to progress The People's Plan (Cressingham Residents, 2016) as an alternative to demolition and to progress resident-led applications for the RTM and RTT. The RTM could assign control over repairs and other services to residents and the RTT carried the potential of stopping demolition altogether. A key aspect of government RTM and RTT assessments was residents' comprehension of Lambeth's existing housing data and practices. CGRMC committee members and directors included an elderly resident who has lived on Cressingham since it was built and does not use a computer; another who holds an MBA in finance from Harvard; three residents for whome English is their second language; one with two disabled children; a resident with long-term disabilities; and myself. The diverse background and expertise of CGRMC committee members provided a nuanced understanding of Cressingham's buildings and public spaces in support of residents concerns.

Committee members undertook an *Exploring the Options* study in 2015, which was part-funded by a small grant provided by *The Environment Partnership*. The study led to a resident vote of approval

to serve RTM and RTT notice's to Lambeth (see fig. 85.). On 21st March 2016, residents served these notices ahead of a Lambeth cabinet meeting and second decision to demolish Cressingham. On 27th May 2016, Lambeth formally accepted the RTM Notice (as a legislative obligation) but advised CGRMC that they would seek a determination from the Secretary of State for the RTM due to a "significant detrimental effect on the provision of housing services […] or the regeneration of the area" (Malthouse MP, 2019). Around March 2017, the central government Department of Communities and Local Government (DCLG) appointed an Independent Assessor to instigate a year-long continuousness assessment of CGRMC and write a final report on residents' RTM application (Lloyd, 2018). On 21st March 2018, the Independent Assessor decided CGRMC were competent to proceed with their RTM plans. On the 9th July 2019, Kit Malthouse, a Conservative MP acting on behalf of the Secretary of State, determined that CGRMC could progress with the RTT process.

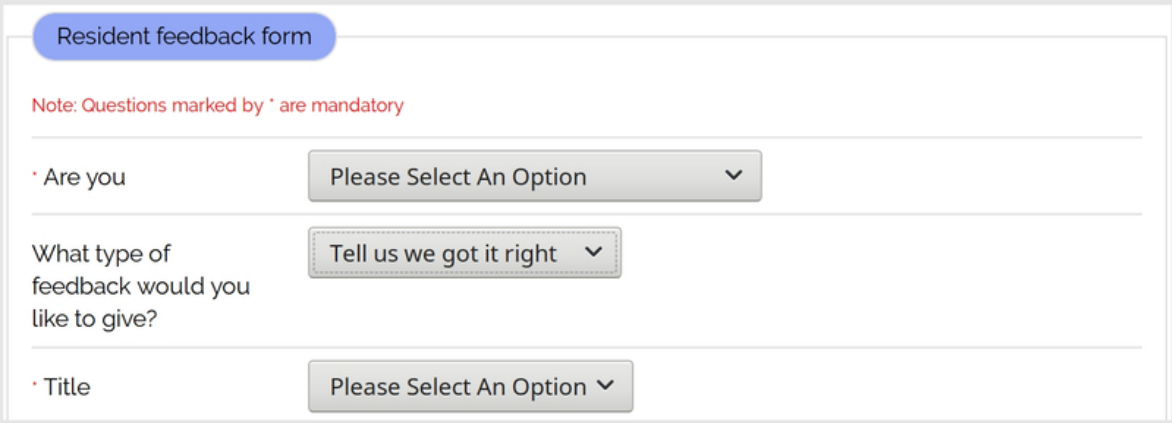


Figure 83. *Lambeth's online complaints form.*

The legislative space of RTT and RTM, and the involvement of the DCLG forced a reluctant Lambeth to meet with CGRMC committee members and provide information. Until the RTT and RTM, residents had found it near-impossible to compel Lambeth to provide extensive repairs data, confirm their accuracy, or understand in detail how Lambeth organised and accounted for programmes of work.

Schema, materiality, and politics

Within RTM and RTT processes, I paid little attention to the Spreadsheet Schema beyond its status as a tool to comprehend Lambeth's data structures. This changed when I printed it on a sheet of A3 paper (for a resident with poor eyesight) in a rush to attend a meeting between high-ranking Lambeth officers and CGRMC. The large-format glossy print (see fig. 84.), as well as the substantial amount of time it took to layout the spreadsheet in an easy-to-comprehend format, elevated its status from an everyday spreadsheet to an important document, which drew my attention to how its logic organised relations between Lambeth and CGRMC. I recognised that this logic was derived from hidden database schema that I had intuitively decoded but to which I did not have access.

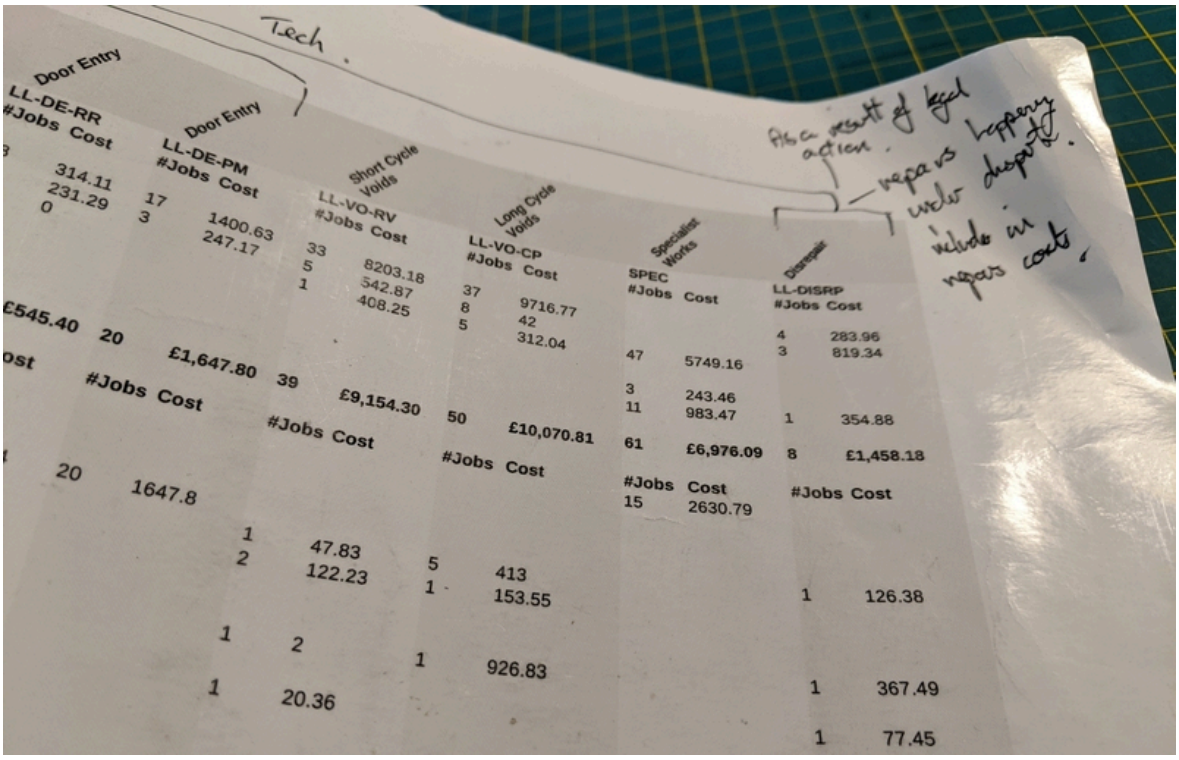


Figure 84. *Well-used A3 version of the Spreadsheet Schema. Annotated during a meeting and part-populated with data.*

Figure 85. *A public community meeting. Residents voted to progress a resident-led application (to central government) for the Right to Manage Cressingham.*

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
1	**ESTATE REPAIRS DATA**	PROGRAMS:		Responsive Repairs		Cyclical Maintanence		Heating		Heating		Lifts		Door Entry		Door Entry		Short Cycle Voids		Long Cycle Voids		Specialist Works		Disrepair	
2	EXPENDITURE	ALL PROGS		LL-RESP		LL-CYC		LL-HE-PM		LL-HE-RR		LL-LF-PM		LL-DE-RR		LL-DE-PM		LL-VO-RV		LL-VO-CP		SPEC		LL-DISRP	
3	**MAIN TRADES**	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost
4	Brickwork - Responsive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Brickwork -Planned	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	CCTV and Door Entry - Technical	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	Carpentry- Responsive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Carpentry-Planned	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Communal Boilers - Technical	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Communal Electrical - Technical	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	Decorating-Planned	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Drainage-Planned	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Electricals- Responsive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	Fencing - Planned	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Finishing- Responsive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	Finishing-Planned	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	Glazing- Responsive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	Groundworks - Planned	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	Groundworks- Responsive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Individual Gas Servicing - Technical	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	Pest Control & Pulbic Health	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	Plumbing- Planned	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	Plumbing-Responsive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Roofing-- Responsive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	Roofing-Planned	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Scaffolding- Responsive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	Stair Lifts - Technical	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	Void Decent Homes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	Void Extra Work	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	Void Rechargeable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	Void Standard Work	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	Water Storage - Technical	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	**TOTAL MAIN TRADES:**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**
34																									
35	**WORK ORDER STATUS**	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost	#Jobs	Cost
36	RAI – raised	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	AUT – authorised	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	ISS – issued	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	COM – complete	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	CVR – variation request on complete	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	IVR – variation request on issued	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	HLD – hold	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43	CLO – closed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	**TOTAL WO STATUS:**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**	**0**	**£0.00**

Figure 86. *The Spreadsheet Schema. The empty spreadsheet reveals hidden data structures used to manage and maintain homes in Lambeth.*

Lambeth's database schemas are abstract and hidden from view, though they are nevertheless encountered by residents through their material effects and forms. In referring the material, I draw from Paul Leonardi's (2010) discussion of materiality where he connects notions of materiality with material concerns, physical objects, and the digital. Resonating with Simondon's (2016,xv,49) statement that abstract technical objects involve the physical translation of an intellectual system, Leonardi proposes that artefacts are material because they translate ideas into action no matter whether they are a physical, digital, or an idea. He goes on to articulate that artefacts and their consequences are created and shaped by when, how, and why they are used. This lens of materiality opens space to consider the effects of abstract data structures on residents' lives and a politics that emerges from the technical.

It is important to underline that I understand the Spreadsheet Schema as a process that cannot be reduced to a single A3 sheet or file on a computer. The Spreadsheet Schema has origins within the logics of housing management in Lambeth, my building of the Shadow Database (chapter six), strategies of government, and formal descriptions of data entities and their relations. The Spreadsheet Schema is thus a process of capturing and working with a database discourse as it travels through Cressingham. This discourse is audible within workers speech, recognisable as an algorithmic strategy within the repetitive actions of human and technical components, and visible within council Repairs Jobs, reports, spreadsheets, and other objects and documents that distribute knowledge about Cressingham (see figs 87. and 88.). The Spreadsheet Schema, therefore, is a statement of power and knowledge that exposes a subset of what Lambeth can say, enact, or write about Cressingham's homes and environment.

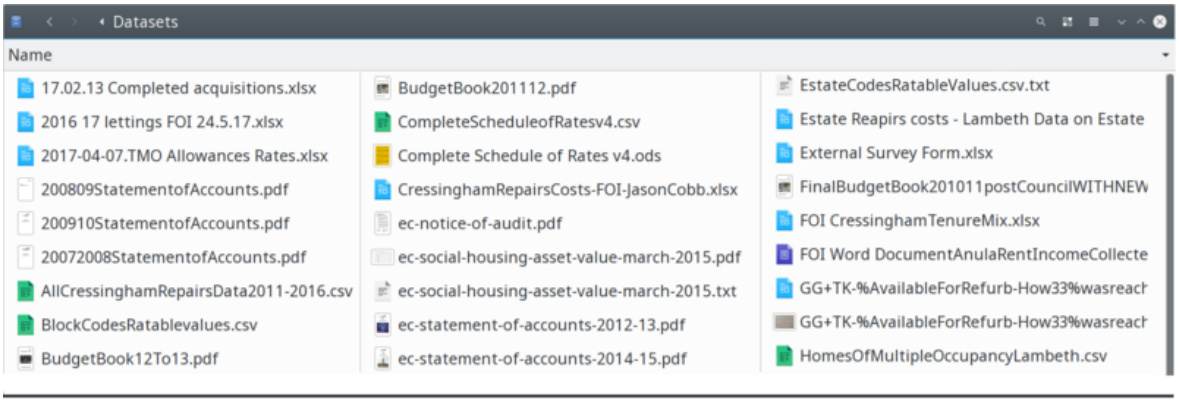


Figure 87. *Documents supplied by Lambeth or amassed by CGRMC. A result of FOI, audit, RTM and RTT requests.*

To echo discussions within STS (e.g., Gorur et al., 2019; Schinkel, 2007), the Spreadsheet Schema revealed how the politics of urban regeneration cannot be reduced to a matter of interests or the hegemony of the powerful. My argument, therefore, understands database discourse as both an exercise of government control and of technical characteristics and processes that configure relations of power and knowledge. Accordingly, Lambeth's databases can support residents' concerns by

revealing their aspects as they constitute relationships between people and the materiality of the objects and contexts they create.

Working for residents, HARMS's self-exposure of work-order status terms − such as *Raised*, *Authorised*, *Complete*, *Issued*, *Variation request*, *Hold* and *Closed* − allowed CGRMC committee members to systematically work through large volumes of Lambeth-supplied data and identify relations between categories of Repairs Jobs, Costs, and contractors' actions. Working for Lambeth, HARMS helps to reduce complexity by presenting information on a need-to-know basis and reducing representations of human action to simple categories. However, the outcome of these simple categories and controls over knowledge produces such a complex and unwieldy mess of housing database systems and practices that they become difficult for Lambeth to manage. This mess of housing management, database logic, and discourses makes compassion and common sense difficult to apply, with the result that Lambeth's workers can be as disempowered as residents when dealing with repairs. The ambiguities that surround these complexities, I argue, creates a space of opportunism for party-political and ideological endeavours that thrive off ambiguity and statements of intent while avoiding effective systemic change.

Repairs Expenditure Detail Report — Standard Responsive Work Programme

from 01-Apr-15 — LL-RESP

to 31-Mar-16 — Year End - FINAL

Ref RMRX10 D07

66,040 Jobs

Work Prog	Repairs Code	Area Name	Contractor Name	Repair Type	WO Ref	WO Description	WO Status
LL-RESP	RA1N	NORTH AREA	LL-Mears Ltd	01 Day To Day Repairs	1542214/1		Closed
LL-RESP	RA1N	NORTH AREA	LL-Mears Ltd	01 Day To Day Repairs	1582522/1		Closed
LL-RESP	RA1N	NORTH AREA	LL-Mears Ltd	01 Day To Day Repairs	1627508/1		Closed
LL-RESP	RA1N	NORTH AREA	LL-Mears Ltd	01 Day To Day Repairs	1648012/1		Closed
LL-RESP	RA1N	NORTH AREA	LL-Mears Ltd	01 Day To Day Repairs	1648444/1		Closed
LL-RESP	RA1N	NORTH AREA	LL-Mears Ltd	01 Day To Day Repairs	1649120/1		Closed
LL-RESP	RA1N	NORTH AREA	LL-Mears Ltd	01 Day To Day Repairs	1649362/1		Closed
LL-RESP	RA1N	NORTH AREA	LL-Mears Ltd	01 Day To Day Repairs	1662951/1		Closed

Figure 88. *Spreadsheet provided by Lambeth with traces of hidden database structures.*

It matters on Cressingham what Lambeth's database schemas allow people to do. As computer scientists Tomasz Imielinski and Witold Lipski (1982, p.10) describe, a database schema is a space in which real-world entities are modelled within a database as a predicted set of external applications and a structure of expected queries. Database schemas, therefore, make buildings, residents, workers, work-processes, and other real-world entities calculable within a relational logic that operates as a domain of knowledge and action. In doing so, a schema excludes the complexities of residents' lives and experience through logics of *Programs* of work, *Main Trades*, *Work Order Status*, *Responsive Repairs* and other terms that take no account of their ecological or neighbourly implications, all of which are concerns of the national and local government, which I discuss in the following chapter. More than this, though, a schema can structure a false financial picture because of a disjuncture between data, the practices and materials they represent, and a lack of resident-controls over those representations. A job marked as complete, for example, is not necessarily fixed and may have in fact caused further damage − as has frequently happened on Cressingham.

Residents' access to data is not sufficient to ensure fair democratic processes because hidden cat-

egorisations shape particular outcomes. Residents can only ask questions of data based on data-structures and processes of which they are already aware. While this seems a moot point, a core function or technicity of a database schema is to construct partial views of data and data structures. This limited view means that Spreadsheet Schema cannot describe all data-entities in HARMS that, I suspect, may number in the hundreds or even thousands. However, even if residents had access to and could comprehend an entire database schema in Lambeth, it would still structure particular outcomes based on institutional and commercial aspirations. My point is starkly illustrated by a witness statement from the Grenfell Tower enquiry that indicates that comparable activities, although difficult to prove, may be occurring on Cressingham:

> "In my view, statistics did not provide a true picture of the repairs carried out. When I commenced employment with [Repairs Direct], the ethos was to select specific jobs which was almost a guarantee[d] positive reaction to the works for example, a tap repair, to bolster the percentage"
> *Samantha Burrell, employee of Grenfell maintenance company Repairs Direct*

Arguably, housing repair schemas are driven by a formal logic that carries new possibilities of resident-led knowledge and action. The Spreadsheet Schema exposed a tiny subset of data-structures within a single Lambeth database that officers eventually confirmed was Northgate. As part of the RTM and RTT process, officers were obliged to decode acronyms and terms while explaining the processes that they represented. The Spreadsheet Schema, therefore, was a point of reference that helped to concretise inconsistent terminology within documents and disciplined council officers' speech by ensuring the consistency of language that had eluded CGRMC until that point. Empty fields of data governed and prompted requests for information. Most notably, the Spreadsheet Schema slowed down what CGRMC believed were Lambeth's attempts to derail the RTM process. Specifically, the Spreadsheet Schema exposed Lambeth's lateness in providing information, which was instrumental in obtaining a six-month extension to the DCLG RTM deadline.

The existence of the Spreadsheet Schema cannot be separated from the formation and capacities of CGRMC, the RTM and RTT and, crucially, the party political environment of Lambeth. Labour-led pro-demolition politics offered little chance of comprehending housing management practices and finances − Lambeth, for instance, stopped providing some information to resident-led financial audits (Cobb, 2018b) which questions the co-operative council's commitment to transparency. Campaigners felt that councillors either actively blocked or were uninterested in obtaining information that supported arguments against council strategy: counteracting the negative implications of database categorisations and calculations requires a restructuring of technical, legislative, and party-political associations. While the collective of the Spreadsheet Schema, database logics, and the legislative space of the RTT, RTM, and DCLG went some way to restructure these associa-

tions, this collective could not stop Lambeth in progressing their plans for demolition ahead of Cressingham's community-led transfer of ownership that currently requires funds of around £7m, development of a business plan by CGRMC on a voluntary basis, and ongoing negotiations with Lambeth.

Within Malthouse's determination of the RTT and the Independent Assessors report on the RTM, their positive evaluation of CGRMC is notable. Malthouse variously commented that residents proposals would likely have a positive impact on the area; Lambeth had not provided evidence of concrete progress or plans for regeneration; that the RTT would not be detrimental to Lambeth's housing services, remaining stock, and borough-wide regeneration programme; and that Lambeth's proposals appeared to be a long-term aspiration. The Independent Assessors' report commented on the considerable persistence and resourcefulness of CGRMC and its diversity, organisation, and ability to comprehend complex housing information. In contrast, Lambeth vehemently dismissed residents' proposals for infill-development, refurbishment, and self-management as not viable. These comments make it clear that even if Lambeth's truth of repairs or regeneration data are called into question by new governmental associations, this can have little effect in local government decision-making.

Conclusion

Through the conceptual lens of an abstract technical object, I gained a sense of HARMS as a production-line of abstract technical objects with social, technical, political, and material implications to Cressingham's buildings and residents. In developing this concept, I drew from Simondon's (1958) abstract technical object in relation to Hui's (2016) theorisation of a digital object and Jardine's (1977) definition of the conceptual layer of the relational model. Through my discussion of intersecting acts of programming, activism, theoretical research, and a public performance/workshop I then analysed a myriad of process that occur between a resident reporting a repair, a Service Charge Statement (SCS) arriving in the post, and council decisions to demolish people's homes.

Through this analysis, and a resident-led audit of repairs supported by Service Charge Parser code, I identified how database categorisations produce asymmetries of knowledge that discriminate against council tenants. I also identified how the formation of a Repairs Job is bound up with residents' individual capacities. In my exploration of hidden SOR codes − through a Search Drill contraption, making paper houses, a workshop/performance, and discussions with residents − I identified how hidden categorisations construct social and technical relations while offering potentials to transform and reconfigure how residents collectively deal with Lambeth. Finally, I explored the material effects of Lambeth's database schemas through the Spreadsheet Schema, which captures a database discourse that travels through Cressingham as an intellectual system of housing management that is primarily hidden from view.

Through an analysis of my artist and activist-led research activities, I can claim that formalised data structures within HARMS can work for and against residents. I argued that HARMS can works for residents, by exposing the logics of its operation through workers actions, speech, the meta-data of Repairs Jobs, SCS, and database schemas that structure the vocabulary of relational databases in Lambeth. I also argued that these same logics can make it near-impossible for residents to hold Lambeth to account because they define and construct individual relations with residents, thereby reducing possibilities of collective action. To produce different outcomes of urban regeneration, and a more egalitarian version of repairs and maintenance on Cressingham, I propose that production-lines of abstract technical objects change in conjunction with their legislation, Party Political, democratic, and commercial associations.

Chapter 6.
Alternative aspirations

Introduction

In this chapter, I argue that a database can act as a site of political opportunism where the truth of any dataset is more a fact of its process and associations rather than the realities it represents. In developing this argument, I explore the technical concept of a *database view* as a process of producing knowledge about Cressingham and acting on buildings and residents in a space between metric precision and ambiguity. In my analysis, I draw attention to the more-than-technical *performance* of databases and financial models as they place demands on work, activism, and personal life. Here, the word performance, which I discuss in chapter two in relation to Foucault's concept of power/knowledge, articulates how Lambeth's database systems participate in the world that they also represent − where collectives of technical objects, legislation, party-politics, and humans configure power relations within Lambeth's maintenance and regeneration practices.

In the first of four sections, I discuss the technical concept of a *database view* in relation to Foucault's (1995, pp.171–172) concepts of a *diagram of power* and *the gaze* along with Simondon's (2016) concepts of *technicity* and *milieu*. These concepts articulate government databases as modes of control that can operate outside of human intent. Second, I discuss the *Shadow Database* as a process of enacting resident-led controls over Cressingham. Third, I discuss how the *Regen Calculator* applied the formal logic of code to ambiguous financial viability assessments that marginalise residents views and understanding of Cressingham. Finally, I introduce the *Special Purpose Vehicle* and reference some intersectional feminist principles (D'Ignazio and Klein, 2020b), to discuss how a bicycle trailer instigated a playful inquiry into Lambeth's databases and issues of resident labour, family life, and democratic participation − which leads me to speculate how alternative socio-technical configurations might bring better modes of democracy and control into existence.

Concepts of a database view

A relational database involves the technical concepts of a database view. The *machine view* controls a machine-readable datastore on behalf of humans (see fig. 89.). The *administrator's view* allows human technicians to view and control all data within a datastore via SQL queries. The *user view* allows non-technicians to view or work with data − typically via a GUI, and the *application view* allows external machines to access and control data. As Charles Mairet (1977, p.42) comments in his contribution to Jardine's working conference on the relational model, the administrator's view protects a datastore from the unilateral actions of human or machine users who could destroy the integrity of a dataset. Technical concepts of a database view, therefore, are bound with ideas of control over data and those who can access and work with it.

Foucault's (1995, p.171) concepts of a *diagram of power* and the *gaze* connect these technical ideas of a database view with exercises of government control. Foucault describes a diagram of power, which I introduced in chapter three as a methodological device, through the example of a military

camp that structures a network of gazes. Foucault argues that the camp operates through exact observation where power is laid visible in the geometry of paths, distribution of tents, and orientation of entrances. To draw from Deleuze's (1988, p.34) discussion of a Foucauldian diagram, a military camp might be conceived of as an abstract machine defined by relations between its function, the materiality of its existence, and potentials for knowledge and control over the individuals who inhabit it. As Deleuze succinctly puts it, a diagram "is a display of the relations between forces which constitute power […] with our modern disciplinarian societies."

Figure 89. *A text view of the Shadow Database* lambeth.db *data-store. This binary file is impossible for a human to read without an administrators database view.*

It is notable, therefore, that Harwood (2013, p.26) draws from Foucault's concept of the gaze to describe a database as a machine detached from its subject that an authority can sort for supposedly objective observations within specific fields of attention. I understand Lambeth's database's, therefore, to be a diagram of power involved in the construction of database views (often referred to as reports within the council) to enact control over Cressingham's buildings and residents. Technical configurations, database vocabularies, and distributions of work and data, therefore, determine the kinds of gaze/view/report (I use these terms interchangeably) that can come into existence.

The concept of the gaze imparts a sense of exact and visible control, which is problematic in the context of Cressingham. For example, Lambeth's repairs and maintenance services can be dysfunctional: contractors may not perform work as instructed. Further, database systems and views are primarily invisible. Lambeth's databases, therefore, can be observed to enact ambiguity as a mode of control, which makes it difficult for residents to decipher and act against them. I illustrate these ambiguities and difficulties through a brief discussion of Lambeth's decision to include Cressingham in their regeneration programme in relation to UK Government housing data.

Partial government views

Lambeth approached the Cressingham Residents Association committee members in 2012 to announce Cressingham's inclusion within the council's estate regeneration programme. Notably, Lambeth (2012) committed to "jointly work with residents to develop proposals [for regeneration using] a clear quantitative methodology." Regeneration officers outlined their assessment of seventy-five housing estates in the borough against estimates of five and twenty-year maintenance costs, plan-

ning opportunities, underlying design or structural issues, and socio-economic conditions using Indices of Multiple Deprivation. Officers also explained that their estate regeneration programme was their response to a £56m funding shortfall.

As I related in chapter one, council officers informed committee members that "the database told us Cressingham was too expensive to repair." The word database imparted a sense of precision and a distribution of agency whereby the responsibility for the decision was attributed to a seemingly rational and neutral economic perspective rather than to council officers. However, when myself and others searched through cabinet reports, we found it difficult to determine exactly how Lambeth had arrived at their assessment of Cressingham. For example, council documents variously referenced a database called Lifespan, housing condition surveys, a lack of "headroom" within a Housing Revenue Account, a lack of *decent homes* funding, and a high cost of maintenance − indicating that many more databases than Lifespan were involved in council officers' decisions.

One committee member issued a FOIA request for Lambeth's assessment of Cressingham and the data that underpinned Lambeth's decision (What Do They Know, 2012). In response, the council returned a document that indicated that the numbers *2,3,15*, colours *yellow and green*, and a category of *strategic area* had identified Cressingham for regeneration (see fig. 90.). Lambeth ignored a subsequent request for further explanation. It is tempting to dismiss Lambeth's assessment as an arbitrary decision, which it may well have been. However, a multiplicity of databases, standards, aspirations, and controls surround Lambeth's assessment, pointing to networks of database view, operating at multiple layers of government, that blur comprehension of Lambeth's decision.

The *Lambeth Housing Standard* predates and is a key driver of the council's programme of urban regeneration. Lambeth (2012) describe this standard as "aspirational and realistic: making all council homes decent as well as introducing some additional measures" in the borough. The Lambeth Housing Standard defined technical measures of hazards, state of repair, inclusion of modern facilities, heating, and insulation. Lambeth enacted these measures through partial surveys (involving Lifespan and other databases) of some homes in Lambeth. This survey data constructed a view of homes that orientate Lambeth's application for *decent homes* funding from the central government. Arguably, partial and inaccurate surveys imparted a sense of precision while contributing to Lambeth's financial shortfall because they underestimated refurbishment costs.

The Lambeth Housing Standard was the council's version of a UK Government Decent Homes Standard that emerged from a history (see fig. 91.) of UK Government housing data and controls (Care & Repair England, 2019; UK Gov, 2017): the census, which takes place once every ten years, collected minimal information about housing conditions until 1967 when the *House Condition Survey for England and Wales* introduced the *unfit* category as part of the Housing Act 1957. From 1976 to 2001 the *English House Condition Survey* instigated a survey every five years. Between 1993 and 1994, the Survey of English Housing continuously collected information from nearly 20,000

households. In the late 1990s, the idea of a *Decent Homes Standard* emerged and was refined in the Housing Act 2004 to replace the *unfit* standard. Between 2002 and 2007, the English House Condition Survey measured the progress of the Decent Homes Standard each year. Then, in 2008, the *English Housing Survey* merged earlier efforts to continuously measure the condition of housing stock via a survey of 13,000 households drawn at random via Royal Mail data-sets and a physical inspection of around 6,000 homes. Now, the UK Government publishes *live tables* of the English Housing Survey, along with live tables of *local authority data returns*.

The UK Government (2006) Decent Homes Standard introduced aspirations for the "creation of mixed and sustainable communities." This aspiration is expressed through the Lambeth Housing Standard and categories of affordable housing expressed through Lambeth's (2015, p.47) Local Plan which sets out their framework for urban development. The Local Plan specifies a target for 40% affordable housing in new developments and states that the loss of *affordable housing* may be acceptable on council housing estates to achieve "a more appropriate mix of housing types and tenures." As urban studies scholar Paul Watt (2017) underlines, government ideas of social mixing communicate that poor tenants' will benefit from raised aspirations and social connections by living in close proximity to more affluent homeowners.

Estate Name	Strategic Area	DH INVESTMENT COSTS RATING	L/H VOLUME	PLANNING OPPORTUNITIES	SIZE	ESTATE ISSUES (i.e. ASB & STRUCTURAL)	TENANT PARTICIPATION	TOTALS
	South	2	3	3	3	3	3	17
	Central	2	2	3	3	3	3	16
	Central	2	3	3	2	3	3	16
	South	2	3	3	2	2	3	15
CRESSINGHAM GARDENS ESTATE	Central	2	2	2	3	3	3	15
	Central	2	2	3	3	1	3	14
	North	2	3	3	2	1	3	14
	South	2	2	3	2	2	3	14
	North	2	2	3	3	1	3	14
	Central	1	2	2	3	3	3	14
	South	1	2	3	3	2	3	14
	South	2	1	3	3	2	3	14
	North	2	3	1	3	1	3	13
	Central	1	2	1	3	3	3	13
	South	2	2	1	2	3	3	13
	North	2	2	2	3	1	3	13
	North	3	2	1	3	1	3	13
	South	1	2	2	2	3	3	13
	Central	2	2	1	3	2	3	13

Figure 90. *Lambeth's assessment of estates for regeneration supplied via FOIA. Lambeth redacted all estate names apart from Cressingham.*

AUTHORITY LEGISLATION TECHNOLOGY

1773 Inclosure (or enclosure) Acts became commonplace with the rise of new agricultural knowledge and technology in the 18th century . Inclosure refers to the consolidation and categorisation of common land that removed the prior usage rights of local people. <!-- These acts prefigure contemporary compulsory purchase orders (CPO's) that allow a local authorities to force the sale of residents homes.-->

1889 Creation of the London County Council.

1890 Housing of the Working Classes Act 1890 gave powers to clear slum areas and build municipal housing for displaced residents.<!-- Ironically, ex-slum housing is now some of the most expensive in London-->

1893-1902 London County Council instigated the construction of the Millbank Estate (1897-1902) and Boundary Estate (1893-1899) in London . Respectively, these estates were built on the site of a former Penitentiary in Westminster, and the East End.<!-- Would be interesting to examine repairs and maintenance records of these estates.-->

1900 Lambeth was established as an administrative area titled the Metropolitan Borough of Lambeth. <!-- Once an area is categorised government can act on it.-->

1930 Following the first world war, The Housing Act of 1930 encouraged slum clearance where councils identified, demolished and replaced housing through refined powers of compulsory purchase. <!-- Urban processes of categorisation-->

1940s-60s Large-scale house building continued through new town developments supported by the New Towns Act 1946 .

1957 The Housing Act 1957 introduced the unfit category of home.

1959 Labour's 1959 Manifesto pledge pre-dates the Conservative Right to Buy policy "offering every tenant a chance to buy from the Council the house he lives in". <!-- Aside from the questionable gendered statement, this goes against a commonly held belief that the Conservatives are entirely to blame for the Right to Buy.-->

1961 The Land Compensation Act enshrined the right of landowners to be reimbursed for the potential value of land if it is used for something else in the future.

1963 The London Government Act 1963 allowed for the transfer of London LCC/GLA stock to the London Borough Council where it was located.

1965 The Greater London Council replaced the London County Council.

1965 The Compulsory Purchase Act 1965 set conditions for the purchase of properties forcibly obtained by the state.<!-- Within local authority regeneration projects, the compulsory purchase of homes has often forced the sale of properties below their market value.-->

1972 The Rateable Value of property provided a means to collect local taxes before 1990. Rateable Value values changed to the Poll Tax and now the Council Tax. The Valuation Office Agency defined Rateable Value's for both domestic (dwellings) and non-domestic properties in 1973 Valuation Lists which they only produced in hardcopy. The Agency disposed of their copies after offering them to the respective Local Authorities. <!-- Lambeth automatically calculate resident contributions to repairs on Cressingham using Rateable Values that they print on homeowner service charge statements.-->

1976 The English House Condition Survey instigated a survey every five years until 2001.

1980 The Right to Buy Housing Act 1980 led to a massive reduction in local authority dwellings. In London alone, these reduced from 840,000 in 1984. <!-- I purchased my home from ex-council tenants who had purchased their home via this legislation.-->

1981 The Acquisition of Land Act 1981 regulated the conditions for granting a compulsory purchase order.

1981 770,000 social housing properties in the UK.

1983 Lambeth received 15,301 properties as part of a transfer of social housing from the LCC and GLA, taking Lambeth's total to 48,760 council properties. <!-- Lambeth currently manages around 20,000 council homes.-->

1998 The Housing Act 1988 introduced Assured Shorthold Tenancies.<!-- Means landlords may have an easier route to bring leases to an end and remove the tenant from the property.-->

1990 Section 106 of the Town and Country Planning Act 1990 included a requirement for 35–50% of affordable housing in developments of more than ten homes. Developers exploit loopholes in this legislation. <!-- The term 'affordable' is now meaningless as those on median incomes cannot afford to rent or buy .-->

1990 An inquiry into deficiencies into Lambeth's management, organisation, legal and financial systems undertaken by Elizabeth Appleby Q.C .

1993-4 The Survey of English Housing continuously collected information from nearly 20,000 households.

1998-2011 Almost 100 council homes sold in London for every new home built. <!-- Via London Assembly member Tom Copley on Twitter. Would need to double-check this reference.-->

2000 The 2000 Housing Green paper aimed to reduce local authority housing by 200,000 properties per year, favouring third sector providers. <!-- Via Paul Watt (2019, 56) describes how UK central government seems desperate to absolve responsibility for council housing.-->

2000 The Decent Homes Standard, with its origins in a central government Decent Homes Programme, set out criteria for all social housing to be of a decent standard within ten years .<!-- The Decent Homes Standard is part of why Cressingham became part of Lambeth's programme of urban regeneration.-->

2001 Lambeth obtain a licence for Ezytreev software to record the trees in the borough. As of 2018, Lambeth has mapped 19,000 street trees and more than 15,000 trees in its parks. Ezytreev does not describe all trees in Lambeth.<!-- Cressingham residents requested control over the management of trees on the estate as part of the Right to Manage. However, while trees are arguably the most significant cause of structural damage on the estate, officers refused this request.-->

2001-02 A housing stock condition survey by 'Property Technionics' covered 11% of Lambeth's stock internally and externally. Lambeth extrapolated the findings from this survey to their entire housing stock to identify a sustained lack of capital investment. Property Tectonic introduced a bespoke database called Lifespan that recorded survey data and was structured to address the requirements of Decent Homes Standard legislation.

2002-07 The English House Condition Survey measured the progress of the Decent Homes Standard each year.

2004 The Housing Act 2004 to replace the unfit standard with the Decent Homes Standard.

2004 Lambeth purchased the SX3 housing database system (latterly called Northgate) in perpetuity for £3,774,138.

2005 Northgate Information Solutions acquires SX3. .

2006 Lambeth holds data on residential housing stock within HICS and SX3 databases while they hold data on all operational and non-operational stock (including schools) within the Corporate Property Information Management System (PIMS) .

2006 Between April 2006 and October 2006, Lambeth recorded void (empty or uninhabitable) properties using their HICS database with documentation (such as tenancy agreements) scanned into their Anite@work document management system .<!-- Not sure how or if these systems interconnect.-->

2007 Lambeth store documentation that support SX3 on paper files kept in their 'three area' office. <!-- My leasehold agreement is missing a page because officers failed to photocopy the entire document when I purchased my home in 2006. The omission became apparent after the council supplied the original version of the lease.-->

2007 Lambeth bids to the Department of Communities and Local Government (DCLG) for Decent Homes Standard funding.<!-- Campaigners argue that the council underestimated the amount required to refurbish all council homes in the borough, which has shaped their regeneration programme.-->

2007-08 Lambeth submitted calculations to the Department of Communities and Local Government indicating "a funding requirement of £251m to achieve 0% non-decency". After the stock condition survey work in 2008, Lambeth estimated that 44% of the council housing stock was non-decent. The council argue that investment has not reached a level to counter the ageing process of stock and, as of April 2011, estimate non-decency to be 54%.

2008 The English Housing Survey merged earlier efforts to continuously measure the condition of housing stock via a survey of 13,000 households drawn at random via Royal Mail data-sets and a physical inspection of around 6,000 homes.

2008 Global financial crash.<!-- This resulted in a central government austerity drive which affected local government funding.-->

2008 Lambeth commissioned Hunters to undertake a stock condition survey of approximately 20% of the homes to complement the existing data held on LifeSpan. While Lifespan contained a massive amount of information, it lacked details of the internal condition of homes, especially for street properties. Hunters surveyed some 6,000 properties from a total of 27,246, which was 22% of council housing stock. The survey collected information based on the four criteria for Decent Homes and SAP rating.<!-- Guidance on how a home's energy performance is calculated using the Standard Assessment Procedure (SAP) methodology which underpins Energy Performance Certificates.-->

2008 Lambeth creates Lambeth Living, an Arms Length Management Organisation (ALMO). ALMO's are not-for-profit companies that provide housing services on behalf of a local authority and can obtain additional funding from central government.

2008 Lambeth incorporates the Housing Health & Safety Rating System (HHSRS) and Energy Performance Certificates into their data structures. These are a requirement for all homes let from October 2008.

2009 Lambeth renewed the license for Anite@work document server at the cost of £105,226 per year. The name of this database system was later changed to information@work.

2009 Lambeth introduced a policy that specifies contractors should post-inspect 10% of repairs under £2,000 and that the council should 10% of those post-inspections. Meaning, Lambeth inspects 1% of repairs under £2,000. <!-- https://www.whatdotheyknow.com/request/590985/response/1432143/attach/3/WS2%20Responsive%20Repairs%20Vol2%20Spec8c%20Preliminaries.pdf?cookie_passthrough=1-->

2010 A Lambeth report based on 2008 survey data shows that the number of non-decent properties is 49% compared with 30% as of 31st March 2009. Lambeth delayed the publication of the report while attempting to validate the data.

2010 Lambeth purchase a 'dynamic job scheduling system' called OptiTime from 'Computacenter' to manage responsive repairs.<!-- OptiTime even calculates the time needed for toilet breaks to optimise the actions of workers.-->

2011 The Localism Act allowed local authorities to set their own rules on who gets social housing.

2011 440,000 social housing properties in the UK.

2011 Lambeth begin to publish financial transparency data, though as of 2018 is failing to comply with the Transparency Code. A key omission is the absence of a list of land and building assets they own as required by s35 and s36.

2011 Lambeth bid to the Department of Communities and Local Government for Decent Homes funding.

2011 A restructuring of area housing services where repairs staff are co-located in the area offices and call centres. <!-- Council officers report that the OptiTime system and deployment of contractor staff in the call centre helps to avoid formal complaints by helping to identify and correct repairs failures early on.-->

2011 An increase of surveyors within the housing department, available for home visits, aims to diagnose and complete complex repairs more quickly.

2011 As of 1st April, Lambeth manage around 33,000 properties, of which 23,512 are council homes and 9,413 are leasehold homes.

2011 A pilot project of 1000 surveys undertaken by the council for HHSRS compliance .

2011 Lambeth's Housing Commission recommended the co-production (with residents) of a local housing standard which came to be known as the Lambeth Housing Standard (LHS).

2011 Critical areas of the Lambeth Housing Standard (except external elements) are delivered through Lambeth Property Contracts. Lambeth's restructure of staffing arrangements worked to rationalise property, asset management and maintenance functions.

2011 Lambeth's Calculations Team carried out a "data cleaning exercise" . It used the 'stock dwelling list' to clarify the number of properties on estates and the total rateable values used to calculate repairs and maintenance charges. <!-- information obtained via a private email received from the finance department.-->

2012 UK government because of concerns over a lack of democratic accountability, financial management, and relations with private development companies.

2012 The Social Value Act 2012 requires that public bodies consider the 'social value' a supplier can provide as part of their tender offer. However, it is not clear how to value the impact of something not happening or agree on a method of measuring social value accurately. <!-- Information obtained from a Peoples Audit contributor who attended a webinar titled "Understanding Social Value in Regeneration and New Development". https://www.commonplace.is/webinar-understanding-social-value -->

2012 Lambeth replace their old complaints system 'Respond' with a new module in SX3/Northgate.

2012 Lambeth's Oracle E-Business contract to build a single combined finance system shared with the London Boroughs of Brent, Barking & Dagenham, Croydon, Havering and Lewisham.

2012 Lambeth publish 'Local Housing Standard for Lambeth'. Lambeth reports that this standard has been co-produced with residents though campaigners contest the nature of this co-production. The report introduced the Lambeth Housing Standard (LHS) and identified £499m of required housing investment between 2012 and 2017.

2012 Lambeth cabinet members agree to invest £350m along with £100.5m of Decent Homes backlog funding to achieve delivery of the Lambeth Housing Standard. <!-- This investment leaves a funding shortfall of £56m which underpins Lambeth's arguments for demolishing council estates in Lambeth.-->

2012 Lambeth purchase new software modules to enhance the existing Northgate database system used by their ALMO (Lambeth Living). United Residents Housing, Tenant Management Organizations, Housing Regeneration and Environment, Revenues and Benefits, and Legal Services. .

2012 Decision to award a contract for a new Asset Management Database called Keystone, which integrates with Northgate and aids the delivery of the Capital Programme and captures stock condition information. The contract is for the database system and support services for a term of 10 years at a total cost of £295,678 .

2013 Lambeth introduce the 'icasework' system to manage council members' enquiries. However, Lambeth councillors submit questions in various ways that campaigners have found difficult to track as many are dealt with informally by officers.

2014 Lambeth Council recognises the failure of their ALMO and moves control of its housing back in-house .

2014 Development of a building cost model used to plan future investment in housing .<!-- Unclear who created this model.-->

2014 In an assessment of affordable housing, Lambeth's Asset Management Cabinet Advisory Panel (AMCAP) discuss "disposal of council housing that was considered uneconomic to maintain" . <!-- FOI requests for AMCAP information tends to be refused.-->

2015 The Local Government Transparency Code. Requires a local authority to publish: expenditure over £500; government procurement card transactions; procurement information; grants to voluntary, community and social enterprise organisations; organisation chart; senior salaries; pay multiples; trade union facility time; local land assets; social housing asset value; parking accounts and parking spaces; cases of fraud; the constitution.

2015 Lambeth creates a new estate regeneration website (http://estateregeneration.lambeth.gov.uk) using 'Nationbuilder', a content management system that aims to 'help people organise others, particularly through political campaigns". Previously, Lambeth maintained information relating to regeneration on a free WordPress blogging site and before that on their main website. <!-- Obama used Nationbuilder for his US presidential campaign.-->

2015 Lambeth's new contract for support and maintenance of the Northgate housing system for five years will cost £808,878.42 in total, or £161,775.68 per annum.

2015/16 'Keystone replaces LifeSpan as the primary asset management database and includes an asbestos register. Lifespan did not have the capacity to measure progress on meeting the new Lambeth Housing Standard and was not integrated into SX3/Northgate. Therefore, could not automatically update after completing responsive repairs and planned" . <!-- Heard from a housing officer (no longer working in Lambeth) that much of the survey data was probably 'made up' rather than based on actual inspections.-->

2016 The 2016 Housing and Planning Act .<!-- This puts council housing under even more strain and plays out through financial viability assessments within urban regeneration projects.-->

2016 Lambeth approve the purchase of Oracle Cloud licences for £1,441,671.39 over a three-year contractual term. <!-- This database does not integrate with Northgate, so Lambeth's finance department cannot automatically match/return large volumes of repairs data against payments and invoice details.-->

2017 'Fixing our broken housing market' white paper acknowledges a crisis in UK housing that is increasingly unaffordable. <!-- It is not clear how this might affect Cressingham, and it is hard to see how legislation addresses affordability issues. -->

2017 The Lambeth Homeowners Association was formed by residents when Lambeth decided to disband Area Forums and Leasehold Council structures that provided collective representation.

2017 Lambeth are still formulating the full extent of systems and processes required to deliver their regeneration programme.

2017 Service charge module incorporated into Northgate to create an invoice based accounting system. <!-- This new system resulted in lots of confusion for residents, errors in statements, and multiple letters threatening legal action if residents withhold payments.-->

2020 Mayor of London is currently consulting on the requirements for whole-lifecycle carbon impact assessments for new developments. <!-- Unsure of the implications of this for Lambeth's current planning application on Cressingham.-->

2022 Mayor of London introduces a 'Resident Empowerment Fund' "to provide a meaningful way for Londoners to engage effectively with the planning system and help improve participation in estate resident ballots.

Figure 91. Fold out: Legislation and Lambeth technologies.

Performativity, technicity and milieu

This narrative of databases, surveys, standards, social mixing, and affordability aims to communicate that there is more to Lambeth's assessment of Cressingham than calculations of council affordability. For example, databases have undoubtedly accelerated and multiplied the ways in which the government collects data to act on the urban environment. They also exclude residents' ideas and views of what makes a decent home and community. Indeed, homes on Cressingham are not recognisable in UK Government datasets. Housing databases, therefore, are performative because they generate complexities and ambiguities of knowledge and control at multiple layers of government, which invites an analysis of how the technical constructs relations of power and knowledge.

Simondon's (2016, p.45) concepts of technicity and milieu − both of which I discuss in chapter two − are central to this chapter because they help focus on the *technical essence* of government databases in the ways they exercise control. Technicity provides a lens through which to consider how humans resolve tensions between the capacities of technical objects that shape what a database becomes. Milieu (Ibid, 58, 173), underlines the recursive relationship technical objects have with their environment. Concepts of technicity and milieu point to more-than-technical processes of resolving tensions between the components of Lambeth's database systems and their associated milieu of legislation, local authority finances, party-politics, commerce, and departmental work practices that shape what a database becomes.

Database systems in Lambeth define the kinds of statements council officers, or indeed politicians, can make about Cressingham. Here, concepts of technicity and milieu are important because they point to a power dynamic that cannot be reduced to explanation of party-politics. This is not to say that I ignore party-politics as a vector in these dynamics. Rather, I underline other kinds of politics that are at play, where technical systems can direct what individuals in Lambeth can know and do − which presents a complex diagram of power for residents to decipher. For example, when council officers encounter technical difficulties when responding to residents this can cause them to: misunderstand the availability of information; resolve the issue through technical reconfiguration; ignore residents; or provide incorrect information. Concepts of technicity and milieu, therefore, help recognise that technical processes and configurations shape what humans in Lambeth can know or aspire to do within specific moments − which invites a speculation of how alternative socio-technical configurations might produce different modes of democracy and accountability.

Thinking with concepts of technicity and milieu presents a complex diagram of power that can be felt though not necessarily understood. To quote Simondon's (1954) remarkably prescient observation, via Susanna Lindberg (2019, p.303), the "technical infrastructures of networks, terminals, and programs modulate the texture of the milieu they operate in." Arguably, residents feel this modulation as they attempt to access data or determine relations between council decisions and datasets at multiple layers of government. A network of database views, therefore, are recognisable as a sense

of resistance, control, or ambiguity without residents knowing exactly how or why. Within this milieu, it is difficult to determine whether technical configuration or human intent is the primary driver of these power relations.

Before I move on to my analysis of the research activities in this chapter, it is essential to underline that, as Lindberg (2019) comments of Simondon's theory of individuation, concepts of technicity and milieu can sideline humans' roles within technical collectives. For this reason, I pay careful attention to how database machinery connects with party-political performances that operate in a space between ambiguity and metric precision. My focus, therefore, is on the interplay between the human and technical, as residents attempt to bring alternative resident-led controls and views of Cressingham into existence that unfold to a different logic than those enacted by and through Lambeth.

The Shadow Database

I now discuss and analyse the Shadow Database, which reconstructs an administrator's view of a Lambeth database (see fig. 92.) − I also discuss a user view of the Shadow Database in my analysis of the Special Purpose Vehicle later in this chapter. To create this database, I worked closely with the Cressingham Resident Association (which evolved into the Cressingham Gardens Resident Management CIC (CGRMC)), @SaveCressingham, and *The Peoples Audit*, a campaign that has audited Lambeth's finances each year since 2016. The Shadow Database amassed data on over 33,000 tenant, leasehold, and freehold homes across Lambeth for the years 2010 to 2017. In working with this database, I avoided long-winded FOIA requests for data that I had come to consider slow and inaccurate versions of SQL queries.

The Shadow Database evolved with intersecting FOIA, Local Audit and Accountability Act 2014 (Right to Audit), and Right to Manage requests, which I analyse below. I then discuss how technical components such as primary keys orientated my requests for data and directed Lambeth's response. Through this analysis, I discuss how Lambeth's databases are a function of technical configuration mediated by an associated milieu of legislation, party-politics, human capacities, and errors. This allows me to argue that Lambeth's databases do not present an exact mode of control since residents and activists can produce new knowledge and enact *some* control over Cressingham limited by existing democratic and technical configurations in the council.

The legislative milieu of a database view

In 2015 I used the FOIA to request income, expense, tenure, and bedrooms data for every housing estate in Lambeth (see fig. 93.). Lambeth responded with details about some, but not all, estates. The council excluded categories of private, freehold, temporary, and leasehold tenures (see fig. 94.). I complained that "Figures for EACH estate were missing." Lambeth variously responded that they

"do not have a report on rents", that their "Oracle system does not allow a breakdown by estate", and that the FOIA "does not require them to create new information."

I found it hard to believe that the information did not exist because, as a resident, I knew that categories of estate, property, tenure, and beds were present in council databases. For example, these categories allowed Lambeth to create service charge statements, assess estates for regeneration, request rental payments, and enact a UK Government *bedroom tax* that was prevalent in the news at the time. Lambeth's refusal was frustrating because I understood that writing an SQL query to create this report (or view) was potentially simple work.

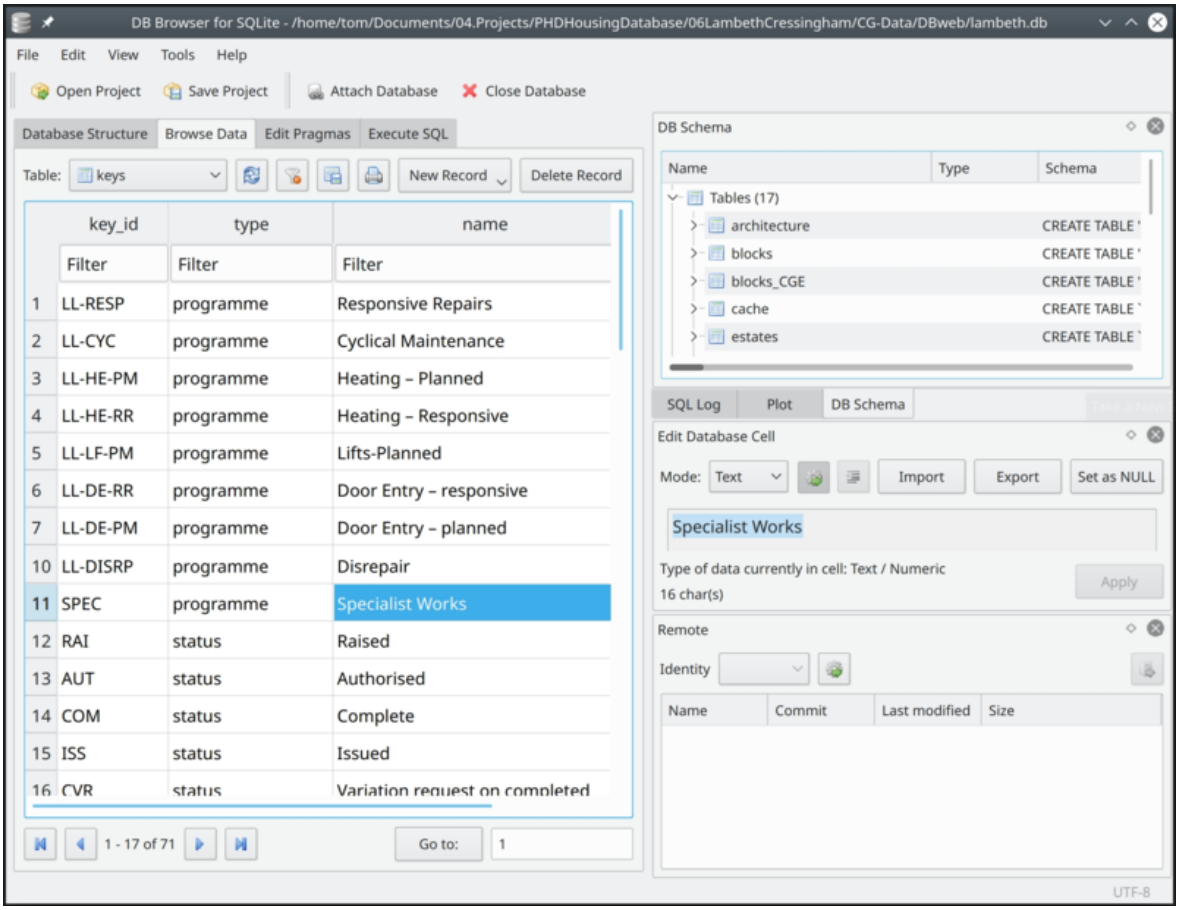


Figure 92. *An administrators view of data in the Shadow Database.*

I could not determine exactly why Lambeth refused my request. This was partly difficult to determine due to the number of individuals who dealt with my query. An email thread listed these as the Freedom of Information Team, Service Improvement, Housing Management, Neighbourhoods and Growth, Legal Services, Complaints Team, Business & Customer Services, and the somewhat baffling "Enabling Cluster." Network infrastructures had thus patterned Lambeth's response by introducing layers of technical and more-than-technical mediation that rendered power dynamics and controls invisible.

I issued other requests for data through the Right to Audit (see fig. 95.). I hoped this legislative space

would generate new associations between myself, Lambeth workers, and technical systems − a shift in the external milieu of Lambeth's databases to alter the function of human-technical components. As the Right to Audit was relatively new legislation, Lambeth had not systematised how they dealt with these requests. As such, I was surprised when the finance department invited me for a meeting because my experience of other requests was that Lambeth preferred to keep residents at a distance.

I realised that my request for invoices and other details relating to Lambeth's Northgate database contained ambiguities typical of my dyslexia. These ambiguities prompted Lambeth's finance department to request a meeting where I learned that separate Northgate and Oracle databases made it difficult to view income and expense data per estate; the finance department was overworked and faced significant redundancies; they saw the potential for financial savings within a resident-led audit; and they were interested in recent questions from myself and other campaigners because "it made them think about their data in a different way." This meeting was key because it clarified that Lambeth's databases are a human and technical process and saw me craft future requests based on my understanding of human and technical capacities. Furthermore, it is notable that Lambeth prevented future meetings between the finance department and campaigners, which indicated party-political influence within these human-machine processes.

The finance department subsequently provided me with a list of repairs for every home in Lambeth for that year. Lambeth had already configured their database systems to generate this report, so it took minimal effort for the department to provide this data. This is an example of how a technically mediated power dynamic can be understood in terms of technicity, where my request was a socio-technical process of resolving tensions between my desire for data and the capacities of humans and machines in Lambeth. Furthermore, when understood as a diagram of power, my difficulties in obtaining data cannot merely be explained as Lambeth enacting control, because it involved a collective of database configurations, my technical understanding, humans in Lambeth, and legislation. This conceptualisation underlines that Lambeth's database systems involve power-dynamics that are impossible for many residents to comprehend in definitive terms. Indeed, Lambeth's databases − as a socio-technical process − can produce different kinds of information depending on their field of relations at any given moment, including who engages with them and how.

The finance team deleted a column of detailed descriptions − from the list of repairs they provided to me − because it contained personal data restricted by GDPR. Without these descriptions, residents cannot audit repairs to determine whether contractors have carried out work as specified. Even my status as a democratically elected member of the Residents Association did not open access to this information. This raises ethical, democratic, and technical questions − should residents be assigned access to database views that affect individual and collective futures? If so, how might this be achieved? It is not difficult to imagine, for example, how a database could provide a view of repairs to residents to support resident-led audits.

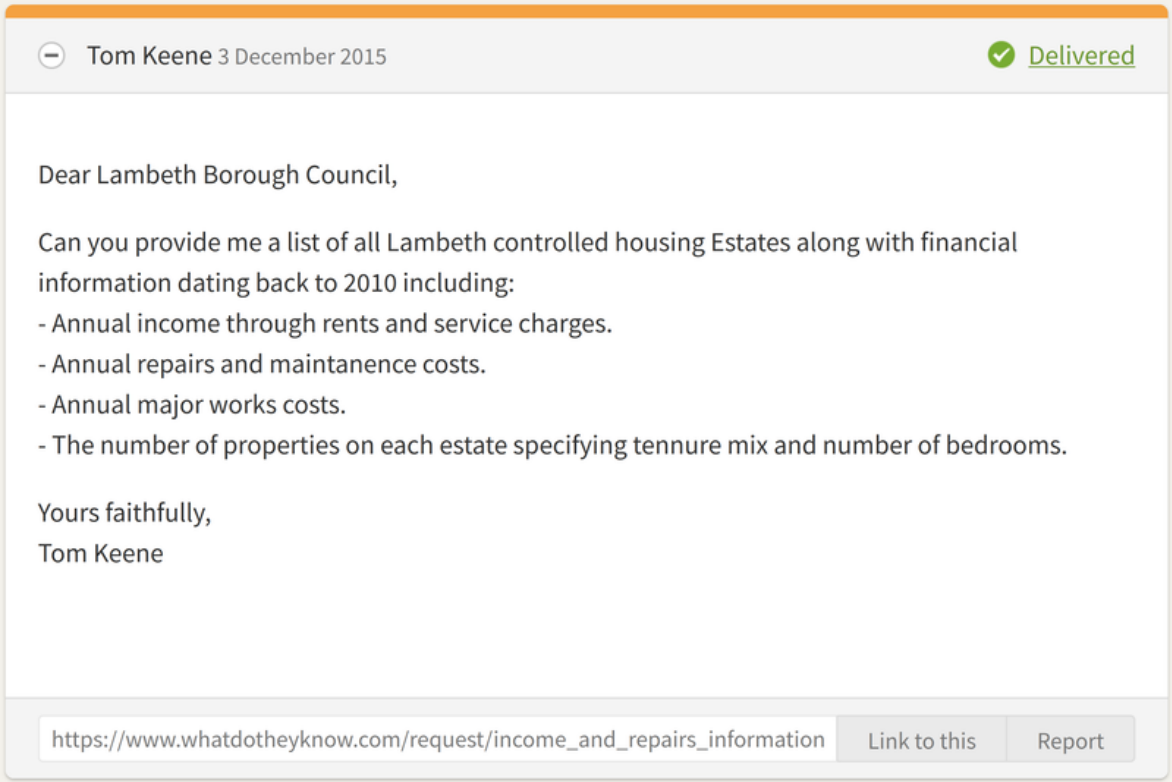


Figure 93. *FOIA request for data on all estates (What Do They Know, 2015).*

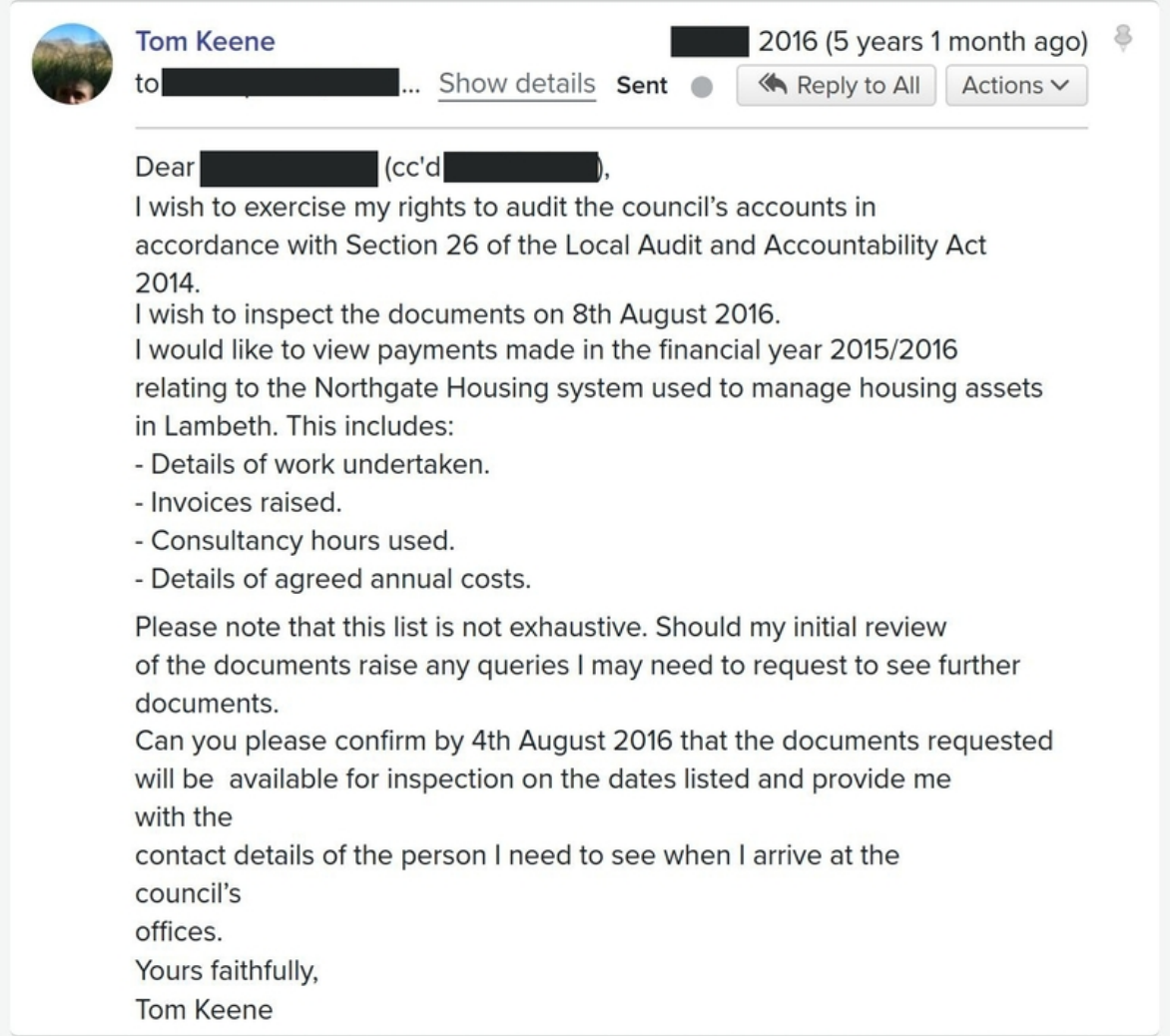
2010/11 RENTS

NORTH LAMBETH AREA	£1,260,430
STOCKWELL & VASSALL AREA	£1,578,952
CLAPHAM AREA	£1,372,845
BRIXTON AREA	£1,218,545
STREATHAM AREA	£892,047
NORWOOD AREA	£914,856
ANGELL TOWN EMB	£63,249
CEDARS TMC	£129,576
COTTINGTON CLOSE TMC	£55,567
COWLEY EMB	£102,509
ETHELRED TMO	£156,425
HOLLAND RISE TMC	£63,736
METRA HOUSING CO-OP	£25,850
MYATTS NORTH TMO	£46,052
PACCA TMO	£20,346
THORLANDS EMB	£66,663
WELLINGTON MILLS TMO	£133,173
BLENHEIM GARDENS RMO	£60,753
LOUGHBOROUGH EMB	£275,915
ROUPELL PARK RMC	£234,354
WALTHAM RMO	£60,609

SERVICE CHARGES

NORTH LAMBETH AREA	£19,045,418
STOCKWELL & VASSALL AREA	£21,733,043
CLAPHAM AREA	£19,038,875
BRIXTON AREA	£20,651,083
STREATHAM AREA	£13,468,664
NORWOOD AREA	£18,127,500
ANGELL TOWN EMB	£2,082,209
CEDARS TMC	£1,096,055
COTTINGTON CLOSE TMC	£843,193
COWLEY EMB	£2,118,999
ETHELRED TMO	£3,018,600
HOLLAND RISE TMC *	£472,711
METRA HOUSING CO-OP	£528,978
MYATTS NORTH TMO	£2,057,085
PACCA TMO	£1,368,867
STOCKWELL PARK EMB	£0
THORLANDS EMB	£1,488,316
BLENHEIM GARDENS RMO	£1,526,498
LOUGHBOROUGH EMB	£5,482,341
ROUPELL PARK RMC	£2,271,600
WALTHAM RMO	£972,004

Figure 94. *Income and expense figures categorised by area and organisation.*



Tom Keene [redacted] 2016 (5 years 1 month ago)

to [redacted]... Show details Sent Reply to All Actions

Dear [redacted] (cc'd [redacted]),

I wish to exercise my rights to audit the council's accounts in accordance with Section 26 of the Local Audit and Accountability Act 2014.

I wish to inspect the documents on 8th August 2016.

I would like to view payments made in the financial year 2015/2016 relating to the Northgate Housing system used to manage housing assets in Lambeth. This includes:

- Details of work undertaken.
- Invoices raised.
- Consultancy hours used.
- Details of agreed annual costs.

Please note that this list is not exhaustive. Should my initial review of the documents raise any queries I may need to request to see further documents.

Can you please confirm by 4th August 2016 that the documents requested will be available for inspection on the dates listed and provide me with the contact details of the person I need to see when I arrive at the council's offices.

Yours faithfully,

Tom Keene

Figure 95. *Right to Audit request for Northgate data.*

Repairs Expenditure Detail Report — Revenue Voids Work Prog

from 01-Apr-15 to 31-Mar-16 Year End - FINAL

Ref 504 RMRX10 D09 Jobs

LL-VO-RV

Work Prog	Repairs Code	Repairs Name	Contractor Name	Repair Type	WO Ref	WO Description
LL-VO-RV	RA3S	SOUTH AREA	LL-Mears Ltd	02 Revenue Voids	1648452/1	
LL-VO-RV	RA3S	SOUTH AREA	LL-Mears Ltd	02 Revenue Voids	1659904/1	
LL-VO-RV	RA3S	SOUTH AREA	LL-Mears Ltd	02 Revenue Voids	1709303/1	
LL-VO-RV	RA3S	SOUTH AREA	LL-Mears Ltd	02 Revenue Voids	1586305/1	
LL-VO-RV	RA3S	SOUTH AREA	LL-Mears Ltd	02 Revenue Voids	1602553/1	
LL-VO-RV	RA3S	SOUTH AREA	LL-Mears Ltd	02 Revenue Voids	1631049/1	
LL-VO-RV	RA3S	SOUTH AREA	LL-Mears Ltd	02 Revenue Voids	1673123/1	
LL-VO-RV	RA3S	SOUTH AREA	LL-Mears Ltd	02 Revenue Voids	1722128/1	
LL-VO-RV	RTAT	ANGELL TOWN RMO	LL-Morrison Facilities Services Ltd	02 Revenue Voids	1674987/1	
LL-VO-RV	RTAT	ANGELL TOWN RMO	LL-Morrison Facilities Services Ltd	02 Revenue Voids	1715684/1	
LL-VO-RV	RTAT	ANGELL TOWN RMO	LL-Morrison Facilities Services Ltd	02 Revenue Voids	1602595/1	
LL-VO-RV	RTAT	ANGELL TOWN RMO	LL-Morrison Facilities Services Ltd	02 Revenue Voids	1590383/1	

Figure 96. *Excerpt of data returned through the Right to Audit.*

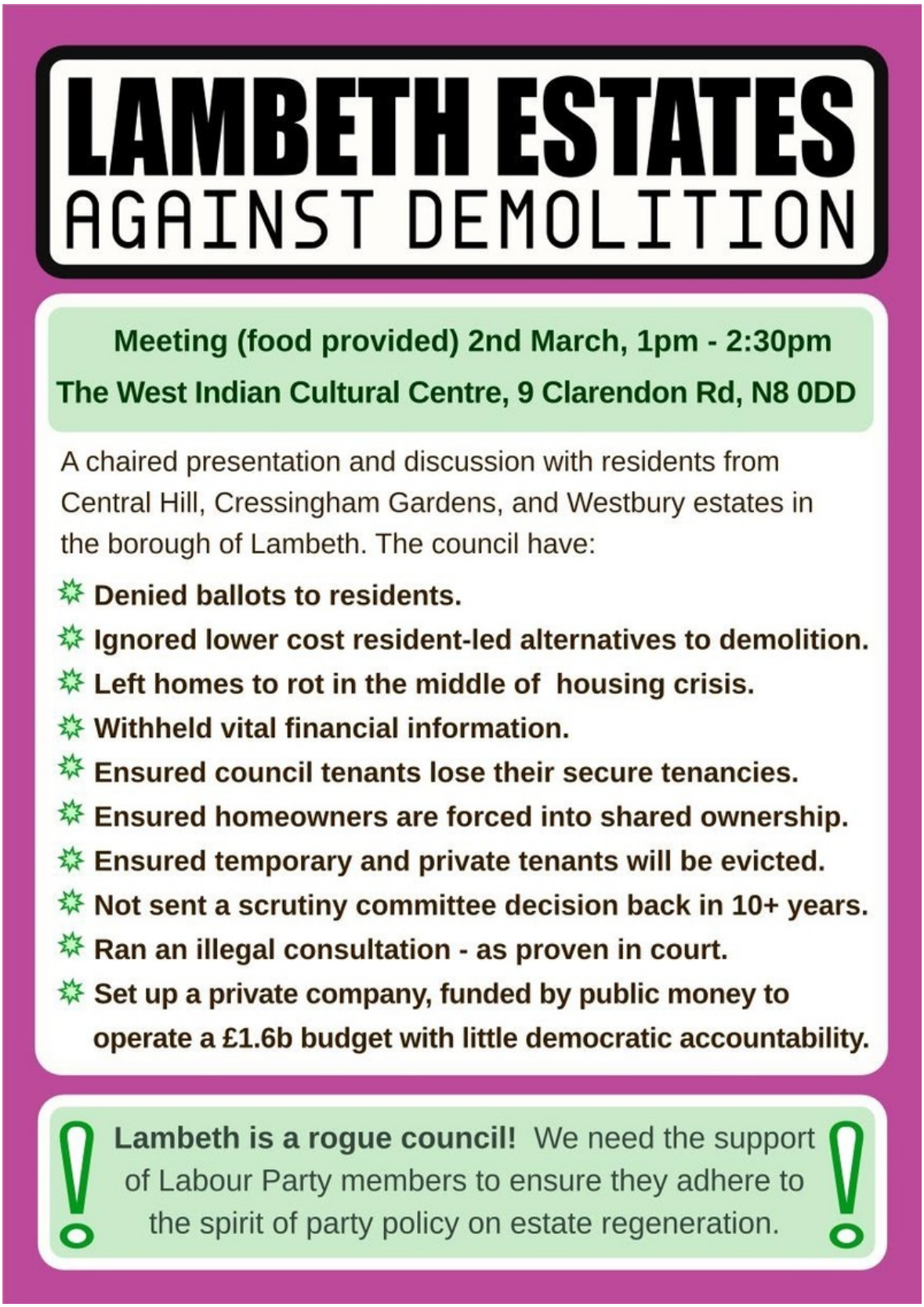


Figure 97. *Activist flyer that aimed to garner support within the Labour Party. While the meeting was cancelled, the flyer coalesced key concerns that proved useful for social media campaigning.*

The Right to Manage introduced new sets of associations with Lambeth's databases. CGRMC's application for the Right to Manage Cressingham obligated council officers to attend regular meetings with committee members. The central government assessment of CGRMC also ensured that Lambeth supply detailed descriptions of repairs to the committee. Here, it is important to underline that the Right to Manage provided opportunities to understand Lambeth's databases as a process, where access to both data *and* information about technical systems were important for meaningful democratic engagement.

The Labour party's political influence is notable in Lambeth, particularly in its cabinet-leader mode of governance that exerts tight control over how decisions are made and voted on − organised around a select few councillors who set the strategic direction of policy areas, such as regeneration. Outside of council governance structures, campaigners experience party-political influence through tighter controls over data-requests, a lack of access to departments and individuals, and public relations exercises across social media complaining that campaigners waste council time (Lambeth Borough Council, 2017a) − while ignoring accusations of financial mismanagement (The Peoples Audit, 2017) that caused Lambeth's independent auditors KPMG (2016) to not certify Lambeth's 2015 audit as complete because of campaigners' objections.

In discussing party political-influences, I feel myself being drawn into describing campaigners' accusations, and Lambeth's denials, of price-fixing, sale of council assets below market value, and non-existent repairs. These details are well documented in the local press (e.g., Cobb, 2018a) and point to a domain of claim and counter-claim that appears to affect little structural change to Lambeth's maintenance and regeneration practices. Here, concepts of an associated milieu of Lambeth's databases and the Foucauldian understanding of institutional truths I introduce in chapter two can help understand how the political milieu of Lambeth's databases sustain the truth of their representation and operation. For example, the fact that campaigners seek to alter political influence to produce alternative views and controls over data (or indeed Cressingham) indicates that they intuitively understand that data, and the ways that Lambeth presents it, do not always reflect material realities (see fig. 97.).

The demands of a database

Technical details shaped specific performances of the Shadow Database. For example, I built the Shadow Database with SQLite which is a self-contained relational database engine implemented in the C programming language (see fig. 98.). C can run on almost any computer hardware and operating system. The technical standard of SQLite meant I could work with pre-existing database software that provided an administrators view to create and edit tables, columns, and data-entities (see fig. 100.). SQLite is also quick to setup, maintain, and distribute − resulting in an estimated one trillion SQLite databases in active use (Hwaci, 2021).

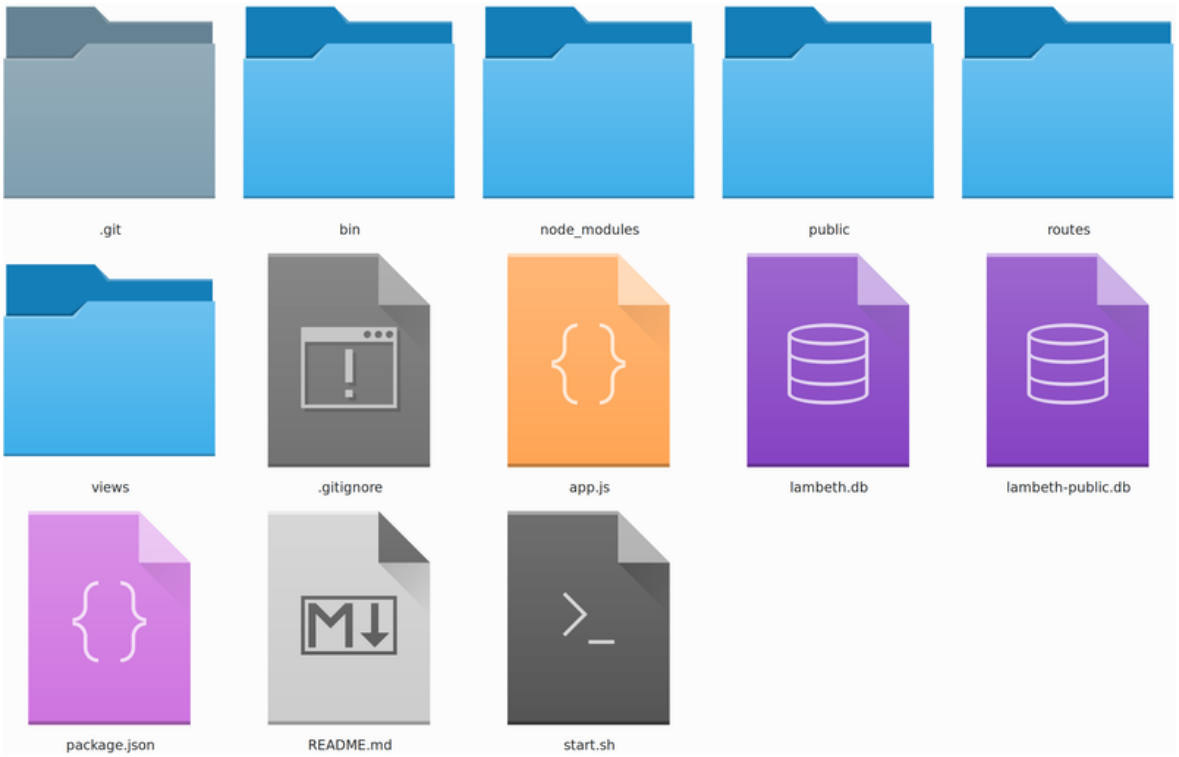


Figure 98. *The lambeth_db and lambeth-public_db files are machine-readable SQLite datastores.*

In contrast to SQLite, Lambeth's databases exist across multiple servers that are complex to set up, maintain, and duplicate. Lambeth's databases are also embedded and concretised within individual team and departmental workflows that can hinder or enable technical and other kinds of change. I observed that working with SQLite modulated the feel of my research, activist, and CGRMC activities because it facilitated a rapid and iterative approach to working with data.

Through my and others' data requests, I obtained 1,583 files – including 9,723 maintenance jobs for Cressingham. These files have titles such as *17.02.13 Completed acquisitions.xlsx*, *Estate Repairs costs - Lambeth Data on Estate Repair Costs for release.xlsx, Keystone - Cressingham Gardens 2017-05-12.pdf*, and *WorkProgrammeDescriptions.jpe*. Each of these provides information and data about different housing practices in Lambeth. The scale of this data demanded a database; this scale is characteristic of how housing databases multiply their views and place demands on residents.

I wrote *import code* (see fig. 101.) to clean and govern flows of data into the Shadow Database. This code stripped away information about departmental work practices expressed through different naming conventions. I learned, for example, to adopt the term *Work Order* in place of *Repairs Job* (commonly used by call operators) because a Work Order describes a wider range of housing practices than repairs − from gas inspections to surveying properties. Clean data, therefore, got me closer to the relational logic of HARMS − where the code merged lists of Work Order's, Estates, Property Addresses, and categories into the single tables of the Shadow Database. I Ended up with over 400,000 rows of data that would have been impossible to input by hand (see fig. 99.).

```
        # Notes: By working through incomplete datasets you inhabit
        # the mindset of past technical processes and decisions
        def data2015to16(self, table):
            fields = [ # [TOfield, FROMfield, type]
                    ['WORef', 'WORef', 'txt'],
                    ['WOStatus','WOStatus', 'txt'],
                    ['WorkProg', 'WorkProg', 'txt'],
                    ['ContractorCode','ContractorName', 'txt'],
                    ['EstateCode','estate_id', 'txt'],
                    ['FinalCostInPence','TotalCostNow', 'int'],
                    ['DateRaised','DateIssued', 'txt'],
                    ['DateInvoice','InvoiceDate', 'txt'],
                    ['UnixDateRaised','DateIssued', 'timestamp'],
                    ['UnixDateInvoice','InvoiceDate', 'timestamp'],
                    ['DateFinanceYear','', 'txt']
                ]
            for row in self.cursor.fetchall():
                i = 0
                #print(row)
                for item in fields:
                    tofield = fields[i][0]
                    if fields[i][1] != '':
                        values[tofield] = row[i]
                    if item[0] == 'UnixDateRaised':
                        values[tofield] = self.unixDate(values[tofield])
                    if item[0] == 'UnixDateInvoice':
                        values[tofield] = self.unixDate(values[tofield])
```

Figure 99. *Extract from data-import code.*

DB Browser for SQLite - /home/tom/Documents/04

File Edit View Tools Help

New Database | Open Database | Write Changes | Revert Changes | Open Project

Database Structure | Browse Data | Edit Pragmas | Execute SQL

Table: properties | Filter in any colur

	structure_id	bd_code	residential	property_type	estate_id	archi_id	prop_rv	beds	ownership
	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter
355	STR000303	BD003245	yes	NULL	ENNL7	1	NULL	0	NULL
356	STR000210	BD002855	yes	FLA	EA117	1	NULL	0	LAMBETH
357	STR000210	BD002855	yes	FLA	EA117	1	NULL	0	LAMBETH
358	STR000210	BD002855	yes	NULL	EA117	1	NULL	0	NULL
359	STR000210	BD002855	yes	FLA	EA117	1	NULL	0	LAMBETH
360	STR000210	BD002855	yes	NULL	EA117	1	NULL	0	NULL
361	STR000210	BD002855	yes	FLA	EA117	1	NULL	0	LAMBETH
362	STR000210	BD002855	yes	FLA	EA117	1	NULL	0	LAMBETH
363	STR000210	BD002855	yes	FLA	EA117	1	NULL	0	LAMBETH
364	STR000210	BD002855	yes	FLA	EA117	1	NULL	0	LAMBETH
365	STR000210	BD002855	yes	FLA	EA117	1	NULL	0	LAMBETH
366	STR000210	BD002855	yes	FLA	EA117	1	NULL	0	LAMBETH

Figure 100. *Administrator's view of the* properties *table in the Shadow Database.*

The Shadow Database demanded consistency. My import code converted multiple date formats, such as 1/8/2015 and 1-8-2015, into a consistent timestamp. A timestamp is a technical concept that appeared in the first edition of the Unix Programmer's Manual (Thompson and Ritchie, 1971) that represents the number of seconds since the January 1st, 1970. Converting dates to a timestamp saves processor cycles as well as human labour because it negates the need for a processor to convert text into an integer data-type and did not demand I write much extra code.

```
addEstateId.py          copydata.py              helpfullqueries.md    UPRNresolver.py
addmediaaddresses.py    data.csv                 mergePropertyData.py  uprns.csv
addShortAddress.py      ExportMe.py              parseStreet.py        workorderTable.py
CGEcostsForTMO.py       generateHouseNumber.py   test.py
```

Figure 101. *Programming scripts to import data into the Shadow Database.*

Figure 102. *Save Cressingham t-shirts. The orange t-shirt displays the estate_id and property_id for my home.*

For two years the Shadow Database felt disjointed, clunky, and frustrating to use. For example, I could not display all Work Orders for individual estates and properties because I did not have access to the requisite primary keys. I paid close attention, therefore, to deceptively simple codes and keys such as a UK Government Unique Property Reference Number (UPRN), Lambeth's property_reference, and tenure that exercises control over individual residents and homes. I also discovered a category of *administrative unit* that defines spatial areas of attention and action − involving terms such as block_type, estate_id, and structure_codes − multiplying the potential of possible

views and control. These and other keys imparted a predictable relational logic to my ongoing requests for data.

I came to recognise that UPRNs are an essential component of UK Government, Lambeth, and the housing market, as they connect Ordnance Survey, Postal Service, and HM Land Registry databases. In Lambeth, UPRNs connect with an internal *property_reference* distributed across multiple databases to exercise control over the actions of departments, staff, contractors, and residents' homes. In the Shadow Database, my discovery of UPRNs helped me identify my home by property_reference 616971 and Cressingham by the estate_id EA037 (see fig. 102.).

New knowledge, party-politics, and democratic decisions

With primary keys, it took minutes, rather than months to construct views of data with the Shadow Database. The precision of SQL queries meant that I could generate a view that listed the cost of repair for every estate in Lambeth. I named this view the Regeneration Algorithm assuming that a similar algorithm could have played a role in Lambeth's decision to demolish Cressingham, though I cannot be sure (see fig. 103.).

The Regeneration Algorithm displayed an annual average maintenance cost of between £625 and £1032 per home on Cressingham between 2011 and 2018. However, metrics do not communicate multiple realities of repairs on Cressingham that are archived in the collective memory of residents and some Lambeth staff. For example, these maintenance figures include storm damage that Lambeth failed to claim from insurance, poorly installed UPVC windows, and Lambeth's £1.4 million *Weathertight Repairs* programme on Cressingham − calculated to cost less than legal disrepair claims because of poor quality work.

Through a FOIA request I learned that each home on Cressingham generates an income of between £1735 to £2081 each year through rent and service charge payments (What Do They Know, 2015), which indicates that Cressingham generates a profit for Lambeth. A similar pattern was revealed in finances for Grenfell Tower when I requested income and expense data soon after the terrible fire and loss of life − between 2011 and 2017, an income of £4.5m and expenses of £0.5m (What Do They Know, 2017). This begs the question of where the excess money goes and points to systemic issues with local authority housing management practices that are near-impossible for residents to decipher or act against.

My work with the Shadow Database identified Work Order status_codes that variously tag repair jobs as Raised, Authorised, Issued, and Complete. Agre (1994, p.108) would refer to these codes as a grammar of action. I recognised this grammar in a housing repairs tribunal where a Lambeth surveyor revealed the housing department only post-inspect 1% of repairs. This, apparently, was meant as an efficiency-saving method, where contractors self-regulate their work by marking jobs as complete. Arguably, on Cressingham this efficiency accelerated throughput of data (and poor-

quality repairs) while maximising profit for large-scale contractors such as Morrison's and Mears, and shifting the labour of monitoring repairs onto residents, who cannot exercise control over contractors work through a user view of data.

```
### THE REGENERATION ALGORITHM
# QUESTION: How many homes on estates & repairs cost per home?
-------------------------------------------------------------
SELECT E.estate_name, B.props, C.total_cost/B.props/100
    as cost_per_property
FROM 'workorders' A
LEFT JOIN estates E ON A.estate_id=E.estate_id
LEFT JOIN
    (SELECT count(property_id) as num_of_properties, estate_id
    FROM 'properties' GROUP by estate_id) B
ON A.estate_id=B.estate_id
LEFT JOIN
    (SELECT estate_id, sum(repair_cost) as total_cost
    FROM 'workorders' GROUP by EstateCode) C
ON A.EstateCode=C.EstateCode
WHERE WOStatus="CLO" AND estate_id="EA037" GROUP BY E.estate_name
ORDER BY cost_per_property DESC
```

Figure 103. *The Regeneration Algorithm. An SQL query calculating the average maintenance cost for homes on Cressingham.*

The metric precision of the Shadow Database imparts a sense that Lambeth can be made more accountable for their actions and statements. For example, Lambeth Labour Party campaign literature claimed the council had built 1,000 new *council homes* since 2014 (see fig. 104.). However, by referring to the Shadow Database, extracting data from a Lambeth development map (see fig. 105.), speaking with residents who had knowledge of new developments, and issuing a FOIA request, I confirmed that the council had built just thirteen homes at *council level rent* since 2014 (Keene, 2018a; Lambeth Borough Council, 2018; What Do They Know, 2018). Here, Lambeth blur the distinction between their aspirations to build 1,000 homes and the material realities of the actual homes built. Indeed, this ambiguity is undeniably an intentional strategy in Lambeth performed through the category of the *affordable home*, which I discuss later in this chapter.

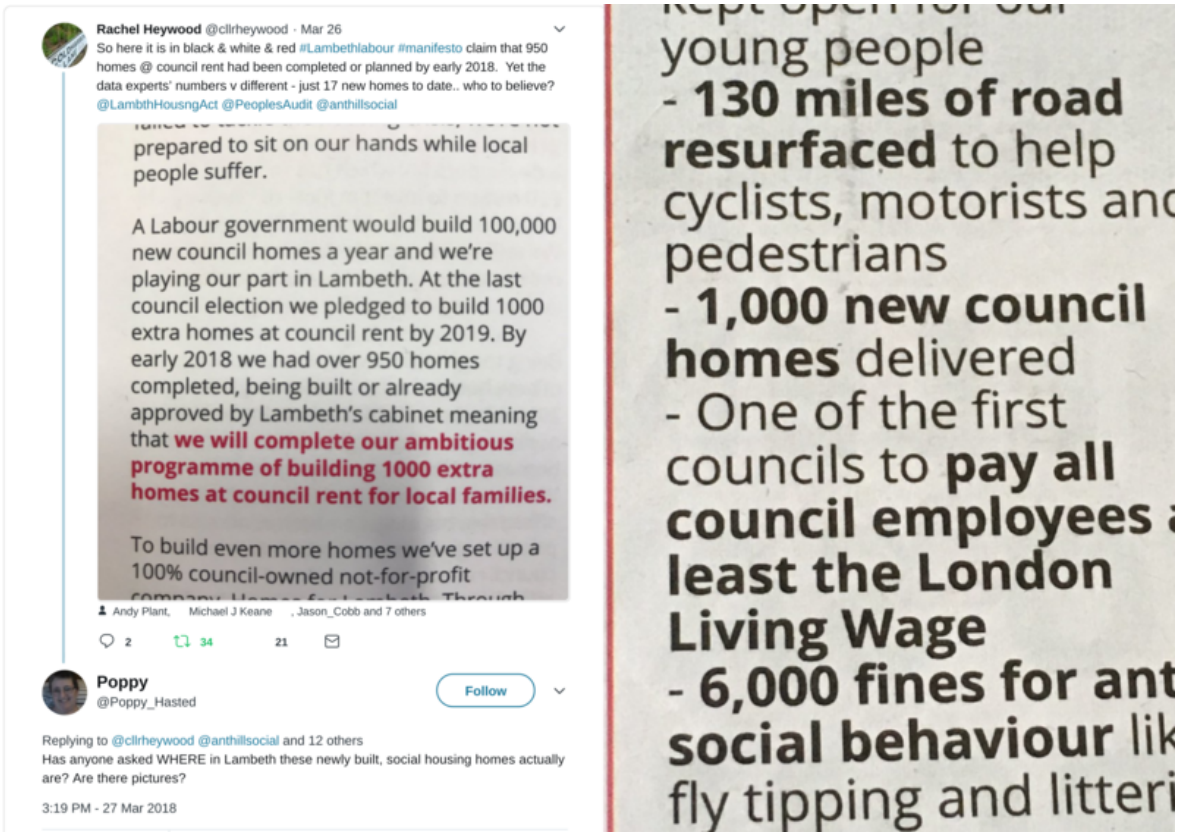


Figure 104. *Number of homes built claimed by Lambeth Labour. Actual amount was 13.*

Schemes Built	Date completed	Developer	Existing homes (on an estate)	Homes demolished	Total homes (to be) built	Total full market	Total Council Rent	B. Additional Council Rent	A.Additional Affordable	% Affordable (A+B)	Additional Information
St Oswalds Place	2016	Lambeth Council (possibly...)			8		8	8	0	100%	This development is situated next to Vauxhall City
Akerman Road	2017	Lambeth Council	6	6	9		9	9		100%	9 new homes replaced a former hostel and bomb-
Macaulay Road		Network			97		4	4	28	33%	"16 affordable rent and 12 shared ownership hom
Milkwood road		Peabody			42		6	6	33	93%	"2 affordable rent and 31 shared ownership homes
Myatts Field North		Regenter	477	305	808	357	247	0	146	18%	187 new affordable homes were built as part of the
1 Palace Road		ASRA			13		1	1	0	8%	This development is part of a site housing a new d

Figure 105. *A spreadsheet I created to calculate homes built by Lambeth and private developers.*

The Regen Calculator

The Regen Calculator is an online form I created that applied the formal logic of code to ambiguous consultation documents (see fig. 106.). Code demands precision through a mathematical logic that expresses facts and rules compiled within a computer processor. In comparison, Lambeth's consultation documents employ a fluidity of language and are open to interpretation. Through this logic, the Regen Calculator calculated the financial implications of regeneration to residents based on Lambeth's (2016) *key guarantees* to residents facing regeneration; financial viability assessments (henceforth, financial models) for the redevelopment of Cressingham (Airey Miller, 2015); and Housing Scrutiny Committee proceedings instigated by @SaveCressingham campaigners (Lambeth Borough Council, 2016b).

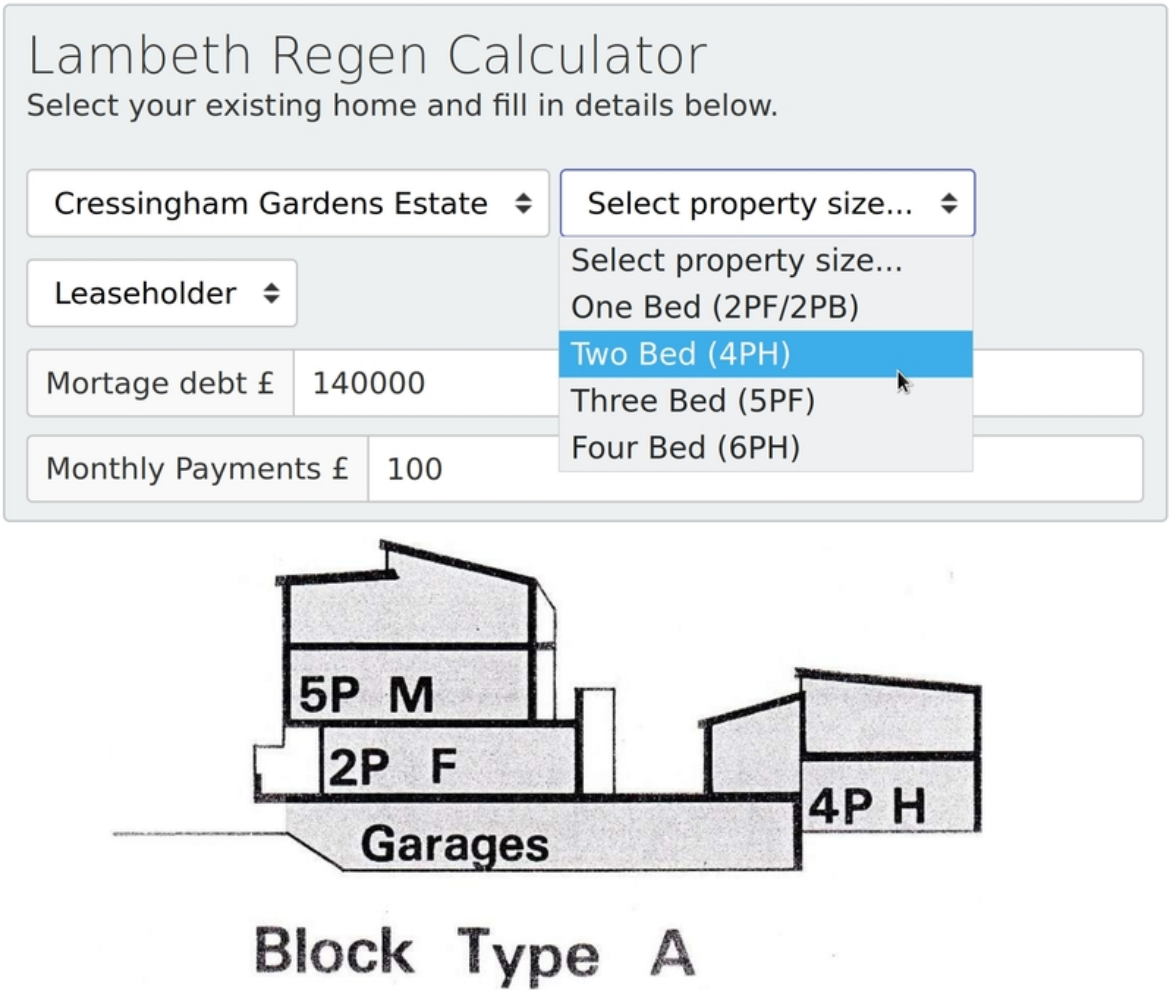


Figure 106. *GUI of the Regen calculator. Includes architectural drawings to help compare existing homes with proposed new-build properties.*

I created the Regen Calculator during a fast-moving consultation over key guarantees. For tenants, these guarantees included Lambeth's promise that any rent increase would be phased in over five years; a transfer from a Secure Council Tenancy to an Assured Lifetime tenancy; statutory home loss compensation; and the option to transfer to another estate at the top of the housing waiting

list. Homeowner guarantees included a *like for like* replacement home with no promise of a garden; purchase of 100% of a new-build home; shared ownership; help with rent if no other options were affordable; a statutory home loss payment; and resident involvement in the design of new homes.

Through the following analyses, I pay close attention to a dropdown list to identify ambiguities in Lambeth's financial models regarding their proposals for regeneration. Brett Christophers (2014; The Land, 2015) discusses how financial viability models for housing emerged among academics at Nottingham Trent University, who aspired for a fairer housing market, and later became a central component of local authority-led urban regeneration. These and other aspirations are embedded in the logic of financial models, which I consider to be abstract technical objects of the kind I discuss in chapter five, which generate outcomes beyond human intent. Christophers discusses the performative aspects of these models by arguing that they construct the world in which they participate. The world they construct ensures a 15% commercial profit, which adds to a crisis of affordability and gives commercial aspirations more weight than residents' ideas about what makes a decent and affordable home.

Lambeth's financial models can seem detached and distant from Lambeth's database systems. However, through my work with the Regen Calculator, I observed how these models prepare the ground for new categories of tenancy and home ownership that will subsequently appear in HARMS (see fig. 108.). Here, Simondon's concept of technicity proves useful in articulating how Lambeth brings new views of Cressingham into existence as a resolution of financial and technical tensions. Specifically, I extend technicity to account for the ways in which databases allow for the rapid reorganisation of strategic approaches. This is an important contribution for ways of thinking about and comprehending the social entanglements of database systems and other technologies based on abstract representation. For example, the demands of government and private finance − as performed through financial models − instigate a transformation, or what Simondon (2016, pp.173–174) might describe as a phase-shift, in Lambeth's databases. This phase-shift is made-possible by the technicity of database systems that allow for structural reorganisation in Lambeth through new categories, database views, housing practices, and modes of control which, in turn, require residents and campaigners to reconfigure how they engage with Lambeth − which places further demands of time and expertise onto residents.

Political performance of a dropdown list

At the heart of the Regen Calculator is JavaScript Object Notation (JSON). This abstract object provided a space to record variables that I struggled to obtain from Lambeth's guarantees and financial models (see fig. 107.). The Regen Calculator reads this JSON object to automatically generate the *property size* dropdown list. Residents identify and select their existing home from this list so the calculator can automatically generate text that describes the financial implications of regeneration on their lives (see fig. 110.).

```
RegenCalculatorData={
  "tenancy": [
      "Leaseholder", "Freeholder", "Secure",
      "Temporary", "Private", "Temporary", "Shared Ownership"
  ],
  "estates": {
      "Cressingham Gardens Estate": {
          "properties": {
              "One Bed (2PF/2PB)": {
                  "valuation": 250000,
                  "newbuild": 436000,
                  "oldcouncilrent": 94.62,
                  "newprivaterent": 354.21,
                  "replacedcouncilrent": 117.00,
                  "newbuildcouncilrent": 204.08
              },
              "Two Bed (4PH)": {
                  "valuation": 325000,
                  "newbuild": 610000,
                  "oldcouncilrent": 108.12,
                  "newprivaterent": 453.96,
                  "replacedcouncilrent": 135,
                  "newbuildcouncilrent": 265.29
              }
          }
      }
  }
```

Figure 107. *Section of the JSON data object at the core of the Regen Calculator.*

I searched for variables of existing and predicted property sizes, rents, and market value of homes to compare the cost (rent and market value) of *new build units* with those of existing homes. However, Lambeth's documents switched between imperial and metric measurements, which made comparison difficult. I also encountered measures of gross external area (GEA), gross internal area (GIA), and net internal area (NIA). When I turned to social media for advice, an architect explained that these measures related to a 1961 *Parker Morris* space standard and current measures in the National Planning Policy Framework. These differing standards demanded that I create a spreadsheet to convert and calculate sizes and costs − where I discovered that new two-bed units would be smaller than existing two-bed homes to undermine Lambeth's claim that all new homes would be bigger.

Lambeth financial models rendered existing lives and homes on Cressingham invisible. Cressingham's architectural drawings from the 1960s identify homes by referring to people − using the codes 5pM, 2PF, 2PB, and 4PH − where P stands for person, M for maisonette, B for bungalow, and H for house − while Lambeth's financial models refer to units and beds. I could not, therefore, initially connect Lambeth's references to *two bed units* with existing flats and houses on Cressingham. This led me to speak with residents to comprehend the layout of different homes on Cressingham with which I had not been familiar − until I realised some months later that I had missed a page within the architectural drawings that already explained this connection. My error in missing this page underlines how abstract ideas (correct or otherwise) of what technical objects are, such as the *people codes* above, can direct outcomes, which adds further complexity to explaining the power dynamics of urban regeneration that are rife with error and misunderstanding.

Financial models of regeneration are predicated on housing market valuations. I turned to the UK Land Registry, therefore, to access a view of sales data for every home on Cressingham and average sales for Lambeth. The Land Registry excluded *beds* information, which prevented comparisons with new-build homes. However, because the Shadow Database now contained that information, I could make this comparison within a *Land Value Plot* − where cyan dots point to Lambeth's aspirations to increase the value of land to fund redevelopment. Here, the hidden labour of regeneration is exposed in the effort of deciphering variables, navigating space standards, and relying on years of effort within the Shadow Database. Financial models exclude this labour.

I incorporated market valuations from the Land Value Plot in the Regen Calculator. These figures allowed the calculator to estimate that a two-bed homeowner would face a 180% mortgage increase in a new-build home (see fig. 110.). Campaigners argue that such an increase is likely to force residents into categories of shared ownership that are increasingly recognised as an expensive form of tenancy rather than ownership (O'Kelly, 2020). The shock of these metrics caused one resident to comment that "they made them feel unwelcome in their own home."

The time it took to decipher homeowner variables meant that I could not incorporate calculations of tenants' rents into the Regen Calculator ahead of a consultation deadline. These calculations exposed a rent increase of up to 25% on a new-build estate rather than the 15% communicated by regeneration officers in tenant-only meetings. Lambeth had used averages to make the percentage increase of rents look more palatable. When I presented the 25% increase to a Cressingham ward councillor, they repeatedly dismissed it as incorrect until a nearby council officer instantly verified their accuracy. Here, the performance of viability models plays out through council officers and politicians and council strategies to hold separate meetings between those categorised as tenants and homeowners − it is an act of resistance, therefore, when we refer to ourselves as *residents* to avoid divisions of categorisation.

Through the Regen Calculator, I became increasingly aware of the ambiguous category of *affordable housing* that encompasses terms such as shared ownership with rent, shared ownership zero rent, social rents, council rents, council level rents, London affordable rent, affordable rent, London living rent, and genuinely affordable. As the Independent Tenant and Leaseholder Advisers Network (2017) highlights, "regeneration is full of terms that are ambiguous, opaque and sometimes downright misleading such as *affordable*." Indeed, the Affordable Housing Commission (2020) concluded that many categories of affordable homes are unaffordable to those on middle to lower incomes − which reflected my findings using the Regen Calculator.

The words *options* and *affordable* in Lambeth's key guarantees impart a sense of residents' self-determination. However, many residents state they will have no other option than to leave the area of Cressingham. It is no exaggeration, therefore, to argue that Lambeth's financial models are calculations of social viability that demand a better category of person to meet financial aims. Indeed, Lambeth's target (within their Local Plan) for 40% affordable housing on new developments means that the model demands 60% unaffordable housing.

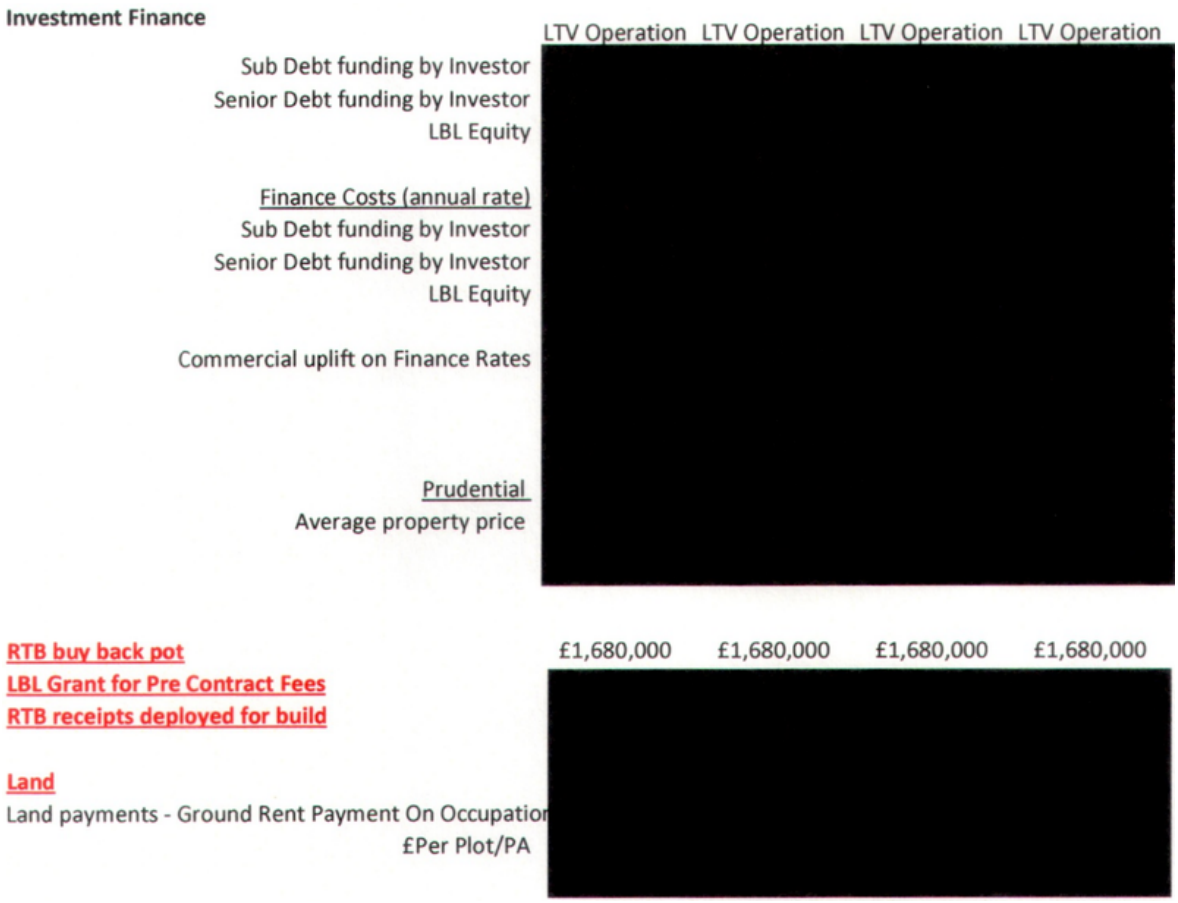


Figure 108. *Extract from a Lambeth financial viability assessment. Most figures were redacted.*

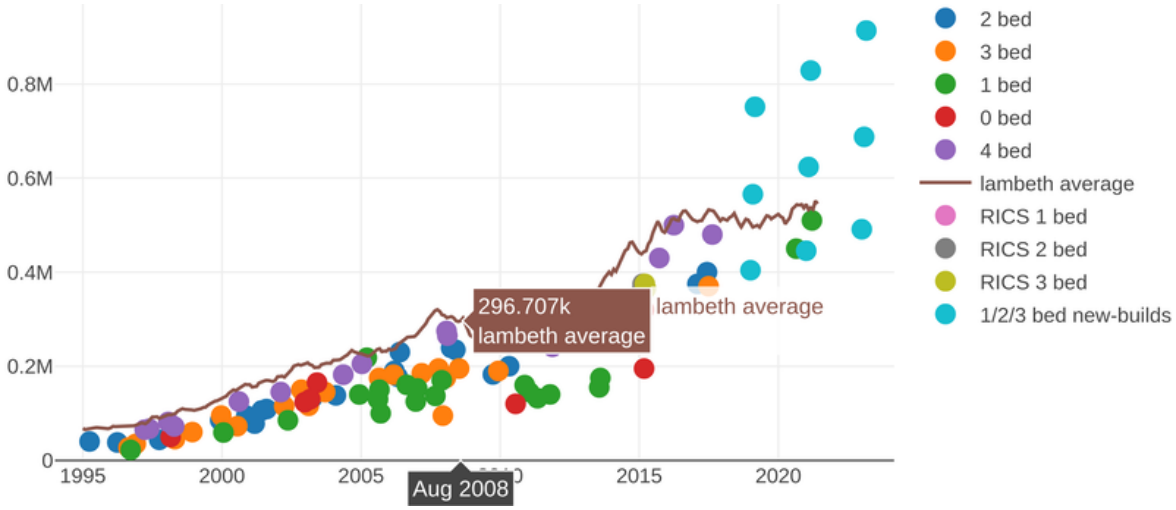


Figure 109. *Land value plot. Interactive diagram displaying historic and predicted sales figures.*

SUMMARY

Lambeth says a New Build home of a similar size will roughly cost	£610,000
Sale of Home (SOH). Lambeth estimates your Two Bed (4PH) home is roughly worth	£325,000
Home Loss Payment (10% as you are a resident homeowner)	£32,500
Funds = Sale of Home + Home Loss	£357,500
VALUE GAP (New Build-Funds)	**£252,500**

Summary Of Options

OPTION A: Could increase your mortgage to Your old mortgage was	£392,500 £140,000
OPTION B: You may need to find a lump sum of Or if you can't port/get a mortgage it would be	£8,500 £148,500
OPTION C: You would pay Rent paid on % owned by Lambeth Warning: This does not pay back the % owned by Lambeth	£899 per month £392,500
OPTION D: Means you pay rent of And lose ownership of your home. You used to pay	£1,967 per month £100 per month

Figure 110. *Extract of text automatically generated by the Regen calculator.*

Special Purpose Vehicle

"they won't get rid of me; I'll stand in front of the bulldozers. I've been here most of my life; I was in foster care in that house over there,then next to the park, now I'm here. Cressingham sorted me out − that's proper community"
Speaking to a *Cressingham resident while door-knocking, 2018*

"they do seem a bit slack with other peoples data; they once sent me the database of names and addresses of everyone who lives on my estate when the information I asked for was how many properties there were"
Campaigner, 2016

"the mistake we made last time was letting residents think they could make decisions."
Lambeth Regeneration officer, 2017

"we can't consider the detail of schemes proposed by local authorities as we deal with thousands − we provide the funds and they get on with it"
A representative of the Mayor of London speaking with @SaveCressingham campaigners, 2018

"there were several housing officers and maintenance inspectors who were signed off for a while when I was there. I think you enter this permanent state of existential dread when you can't do the job you want to do, which is to help people and provide a decent service"
Comment from an ex-housing officer, 2019

Figure 111. *Discussions with residents, housing officers, and others.*

Increasingly, local authorities have set up housing companies, termed Special Purpose Vehicles, to generate income through the acquisition of land and buildings, private finance, demolition, development, market sales and rents, and council rents. The private company status of these financial vehicles avoids legislative controls that govern local authority housing finances − such as a (since-lifted) cap on housing spending. Lambeth's version of a Special Purpose Vehicle is called *Homes for Lambeth*, which the council emphasise that they 100% own. Homes for Lambeth is registered as *HFL Group Limited* and owns three subsidiary companies: *HFL Build Limited* − tasked with building homes; *HFL Homes Limited* − a registered social housing provider; and *HFL Living Limited* − a private rented sector housing company.

On Cressingham, I built a bike trailer that I called the *Special Purpose Vehicle* (SPV). I understand this trailer to be a physical diagram of power involving a socio-technical process of evolving the Shadow Database, filming Cressingham, providing a mobile workspace, amusing my children while inspecting repairs, and chatting with residents (see fig. 119.). The collective of the Shadow Database and SPV instigated a playful enquiry into social, ethical, and personal calculations of regeneration

beyond the mindset of financial models and exact metrics. The activity aimed to foreground a sense of community, residents' hidden labour, the feel of Cressingham, and its connection with green space. My following analysis, therefore, focuses on the directive capacities of technical objects that shape both Lambeth's and residents aspirations and ideas of what makes better database machinery.

Figure 112. *Door-knocking at Cressingham with the SPV and CGRMC committee members.*

In 2017, Lambeth employed global real-estate organisation Savills as consultants to help set up the HFL Group. The company is now responsible for up to a £1.6b capital budget (Homes for Lambeth, 2019). As urban studies scholar Joe Penny (2021) argues, local authority housing companies are unlikely to address conditions of affordability or precarity because they rely on market conditions (predicated on raising land value) to meet social needs. Campaigners argue that Homes for Lambeth has little accountability as evidenced by Lambeth's refusal to publish some financial details (What Do They Know, 2021) − even Lambeth's *Risk Register* (see fig. 51.) identifies Homes for Lambeth as high-risk.

My SPV employs humour to enact a view of Cressingham that is cared for, lived in, and tacitly understood in myriad ways outside of financial calculations. As one housing officer remarked of the SPV "it's an exceptionally niche housing joke." Humour is vital to Cressingham residents within regeneration because it communicates a sense of solidarity, a resistance to dominant narratives, and creates space for easy conversation. For example, when a Cressingham resident registered the name

Homes for Lambeth with Companies House (ahead of the council), this caused much amusement for residents and annoyance within the council. Likewise, images on social media (see fig. 113.) poke fun at Homes for Lambeth while building solidarity, visibility, and mutual support across housing campaigns − the SPV performs a similar function. It is notable, therefore, that a special edition of the European Journal of Humour Research titled *Humour in Art and Activism* (Zangl and Bala, 2015) identifies a burgeoning academic interest in art, activism, and artistic interventions that move beyond questions of function or impact to, instead, focus on processes of social interaction. Such concerns are central to my understanding of a database as a process of defining and enacting controls over residents.

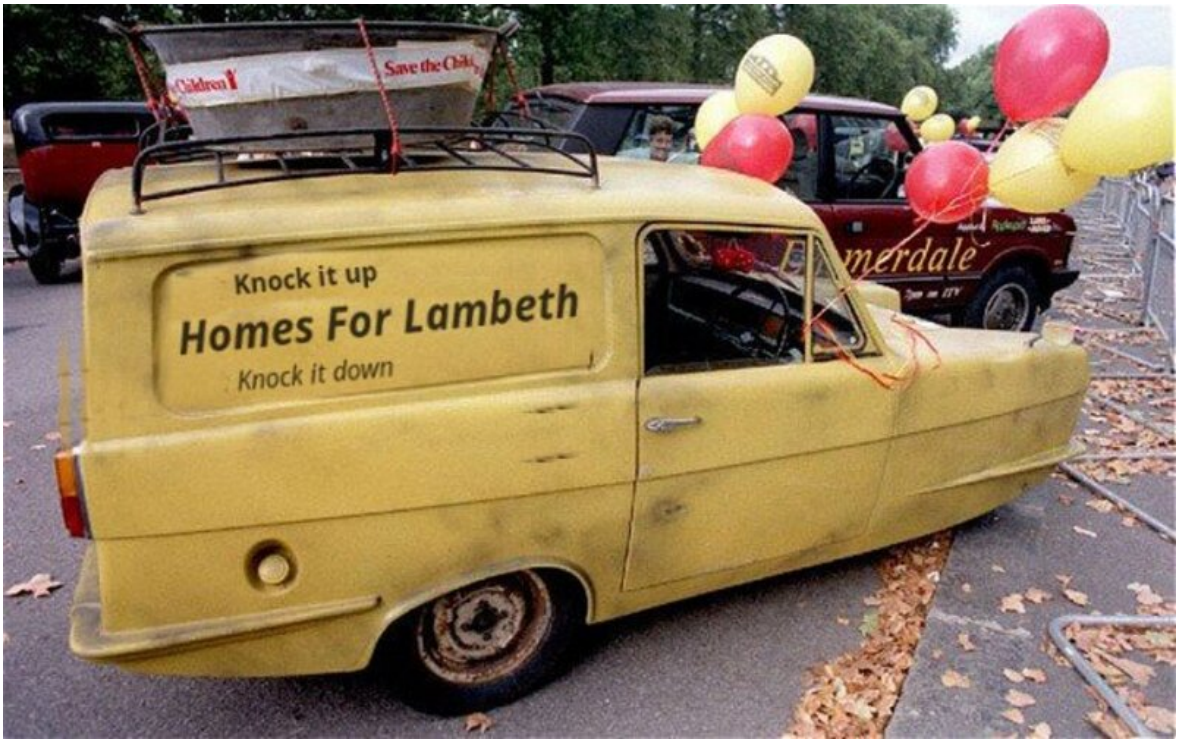


Figure 113. *An image distributed across social media mocking Homes for Lambeth.*

My work with the SPV resonates with Catherine D'Ignazio and Lauren F. Klein's (2020b) intersectional feminist principles for data science, which is rooted in their earlier feminist work (D'Ignazio and Klein, 2020a) and that of Donna Haraway (1988). Notably, these intersectional feminist principles do not restrict the analysis to a discussion of women or gender because, as D'Ignazio and Klein underline, their principles provide a lens through which to address imbalances of power and knowledge. However, as I underlined in the introductory chapter, the focus of this thesis is on a politics that arises from the technical rather than issues of class, race, gender, and other vectors that can enact this imbalance.

Drawing from D'Ignazio and Klein's principles conveys that the collective of the Shadow Database and SPV are technical exercises that unfold to a different logic than Lambeth's maintenance and regeneration practices. Specifically, the SPV *elevates emotion* by employing humour and involving

my children to emphasise the human impact of a database; *makes labour visible* by exposing the hardship of maintaining family life and work while engaging with Lambeth; and *rethinks hierarchies* by resisting expectations over who should care for children or ideas of expertise associated with categories of tenant and homeowner. In Foucauldian (1995, p.31) terms, therefore, the SPV can be understood as a statement of what is possible for residents within the demands of databases and cabinet decisions, while pointing to possibilities of a different diagram of power.

This brief discussion of intersectional feminism, to draw from Haraway (1988, p.576), adds to my analysis of the SPV and Shadow Database by helping to expose how Lambeth's databases privilege a database view of people's homes and lives over residents lived experience and knowledge. Specifically, these theoretical resources help to underline the embeddedness of the SPV and Shadow Database and the ways they expose resident-derived knowledge and understanding of Cressingham beyond the limits of database categorisations. This framing connects with my Foucauldian understanding of power and knowledge by questioning the objective truth of housing data and opening considerations of how technical systems introduce both intentional and unintentional power dynamics. Indeed, it is notable that Haraway (1988, p.581) discusses "the gaze from nowhere." which brings Foucault's concept of the gaze to mind − however, while Haraway connects her concept of gaze with the terms *male* and *white*, I consider, through Simondon's concept of technicity, how *technical objects* in and of themselves can direct partial and exclusory views of Cressingham from which imbalances of power can arise.

Resolving social and technical tension through a database

A lack of wireless infrastructure governed how I evolved and worked with the SPV and Shadow Database. For example, Cressingham's community space, the Rotunda, did not have an internet connection because British Telecom did not recognise the Residents Association as a business. Further, many areas of Cressingham suffered from a poor mobile phone and data signal. These restrictions meant that an online version of the Shadow Database was of little use in committee meetings, so I resolved these tensions by displaying the Shadow Database on my laptop, which I also took on walks around Cressingham to check repairs.

The proximity between my technical work, CGRMC, buildings, and residents of Cressingham was essential to the evolution of the Shadow Database. The administrator's view of the Shadow Database was cumbersome for committee meetings because it required my constant input and views of data were often difficult to comprehend. Thus I programmed a GUI to quickly navigate through lists of repairs for individual homes on Cressingham (see fig. 114.), thinking that I would (eventually) create a mobile application that worked offline without a wireless connection. However, it became clear that committee members did not have the capacity (in time or labour) to physically inspect repairs because of the immediate demands of enacting the Right to Manage.

I created a summary view of repairs data to help prepare the CGRMC business plan (see fig. 115.). Unexpectedly, and with minimal additional labour, I realised that this summary could generate the same view for every estate in Lambeth − thinking this might prove useful at some point. I also discovered that I could copy the table of data from a browser directly into a spreadsheet − allowing some committee members to work with data outside the restrictions of the Shadow Database GUI. My work with the GUI, therefore, exposed the Shadow Database as a site of latent potentials within the ecology of an SQLite database, schema, HTML, spreadsheets, interface components, JavaScript, SQL, and network configurations − each of which direct possibilities of distribution, association, control, and knowledge of Cressingham.

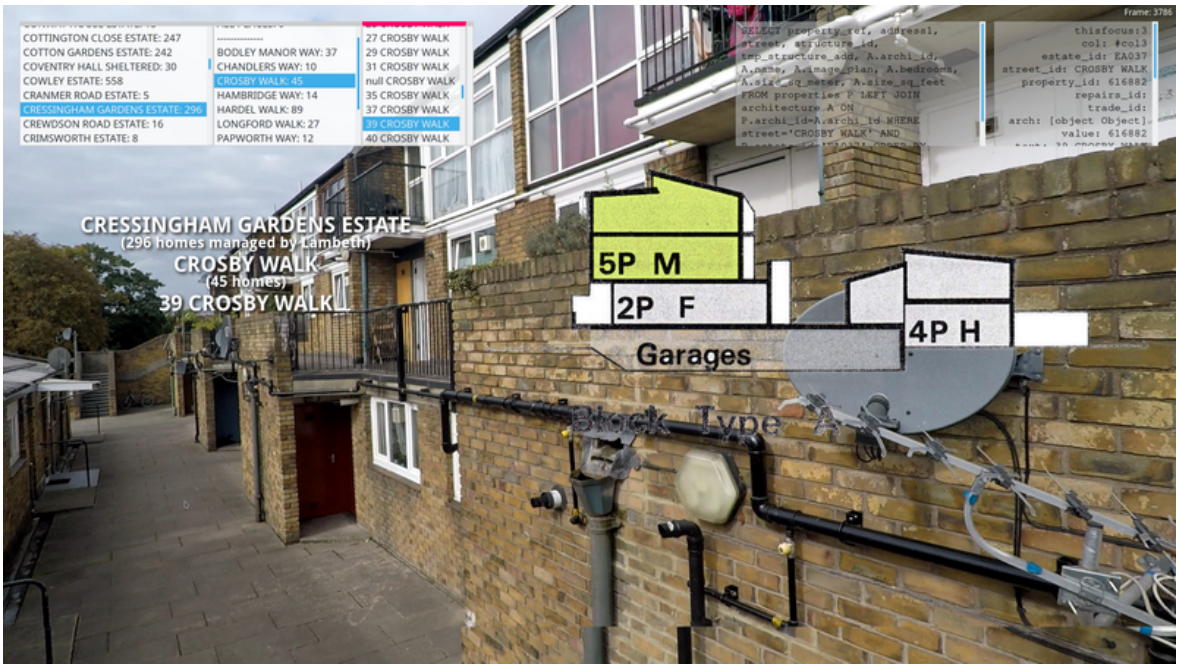


Figure 114. *Early GUI for the Shadow Database incorporating video footage. Displays information at the estate and individual-property levels.*

The GUI of the Shadow Database governed and controlled how myself and other committee members could comprehend or work with data. For example, the GUI unintentionally excluded maintenance and Repairs Jobs to the Rotunda and public areas of Cressingham that were not categorised by walks, ways, or unique property_reference's. Here, the administrator's view and my role as a technician was essential. Through me, committee members could ask questions of the Shadow Database outside of existing views and controls. While this supported and facilitated CGRMC's work, I felt uncomfortable being a gatekeeper to information.

Committee members often found it difficult to associate repairs data with the location the data described because they were more familiar with some areas of Cressingham than others. This difficulty prompted me to include architectural drawings from the Regen Calculator in the Shadow Database GUI. I also considered incorporating a map of Cressingham into the GUI, though I realised that a paper map was less cumbersome and quicker to use within committee meetings.

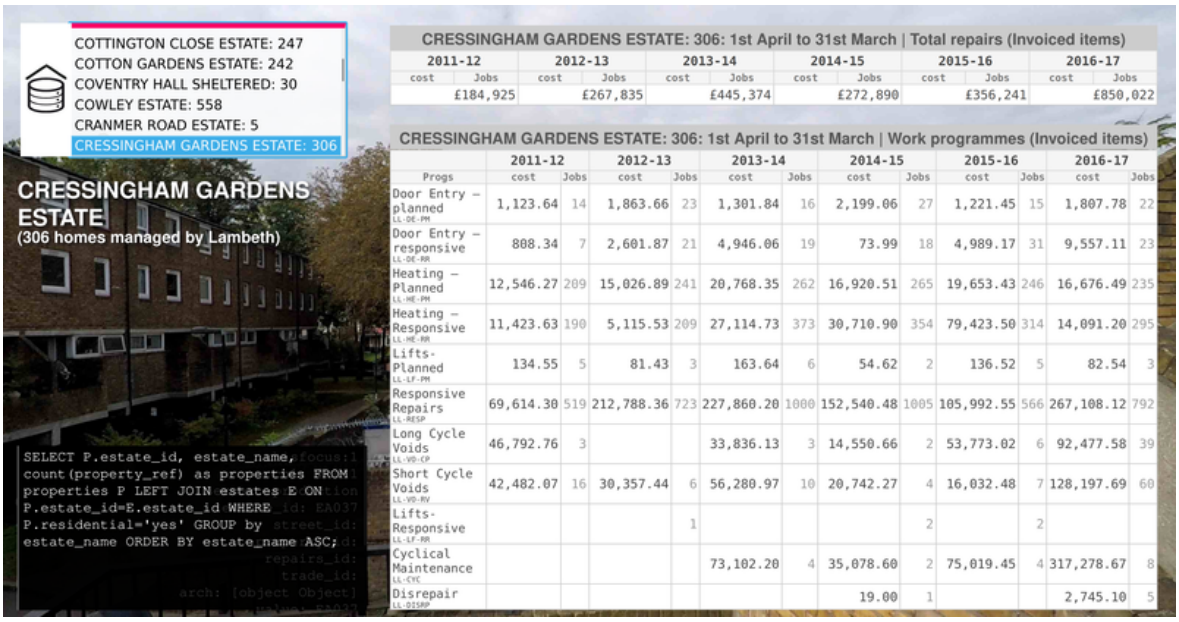


Figure 115. *Public view of the Shadow Database. Excludes all data protected under GDPR and displays summaries for all estates.*

I began to experiment with overlaying repairs data over video footage of Cressingham, thinking this might make repairs data feel less abstract. The aesthetic was eye-catching and caused some residents to comment that it "looked beautiful" (see fig. 114.). This was an unusual comment for a housing database. This prompted me to play and experiment with code snippets, command line applications, and SQL queries that controlled the playback of video. The relational model allowed for this experimentation without affecting the existing the GUI or the ongoing work of the CGRMC committee. Put another way. The Shadow Database enacted an alternative view of Cressingham as a counter-point to the stress, control, or, indeed, boredom of trawling through housing data as myself and others engage with Lambeth's systems, while accentuating Cressingham's connection with green space (see fig. 116.).

The Shadow Database demanded human labour and technical resolution. I was forced to add a *media* and *media_views* tables to the datastore to trigger video playback via SQL queries − by relating video timecodes with footage and data for individual homes. The collective of video, computer processor, SQL queries, GUI, and database categories caused video playback to stutter, the GUI to become sluggish, my laptop to become hot, and an increase in the speed of its fan. The database system was communicating that the computer processor was struggling with playback of high definition video controlled by rapid-fire SQL queries generated by an optimised GUI. I listened to the demands of the Shadow Database by creating a *cache* table in the datastore and a matching *cache object* in the GUI. This cache instantly reduced processor load, heat, noise, and the flow of data between the datastore and GUI. The comparable demands of Lambeth's databases are recognisable with the comment "the database is running slowly today" that, no doubt, cause IT staff to resolve the tension between technical configuration, departmental finances, and existing work practices.

Figure 116. *A walk through the centre of Cressingham, still from SPV video.*

A democratically accountable database

Building the SPV was my attempt to resolve more-than-technical tensions. These tensions were evident in my sense of injustice and responsibility to my neighbours, which produced an internal pressure to audit repairs; my wish to spend time with my children; my aspirations to film Cressingham because of concerns over imminent demolition; my desire to experiment with and enjoy playing with video and writing code; my anxieties that artistic work was frivolous and more beneficial for my career than the immediate concerns of CGRMC. Building the SPV was a technical act that attempted to address and resolve these tensions, while recognising the impossibility of this task. Here, the word *my* is important because it unequivocally situates the SPV, Shadow Database, and this research project in my academic, personal, activist, and public life without attempting to create false boundaries between each. In doing so, I communicate that database systems within their associated practices are always embedded in and generative of a socio-technical milieu that affects their operation and what they can become − no matter how objective a database view might seem.

I built the first version of the SPV at home from found objects on Cressingham, including a broken kids' bicycle trailer, water-damaged plywood, and an extending pole (see fig. 117.). I attached a video camera to the pole so that I could film upper walkways from ground level, minimising

physical labour. The sway of the pole prompted me to add a motorised *gimbal* to generate a stable view of homes, which added a machinic feel to video footage that was detached from human control. However, the combination of riding my bicycle, looking after my children, and dragging the SPV was physically and mentally demanding. This caused me to abandon filming, though not in failure. Instead, I reflected on the logic of the task I had set myself and decided to make the SPV more enjoyable.

Figure 117. *First version of the SPV.*

I remodelled the SPV into a pushable cart with a shelf for my laptop and a set of front wheels cut from a discarded kids' scooter (see fig. 119.). The new SPV was a better fit for my garden gate and Cressingham's walkways and was thus easier to handle. I built the new SPV in University Design Department workshops where I obtained a technician's support to operate professional fabrication machinery, including a £40,000+ machine that laser-cut text into birch plywood (see fig. 120.). My institutional associations meant I constructed the new SPV in less than half a day − much quicker than at home. Through this observation, I aim to highlight sets of associations with a simple bike trailer, the Shadow Database, my own capacities, finances available to academia, and the difficulties of making technical objects on Cressingham − all of which predicate the kinds of objects, processes, and associations that can come into existence on the estate. It is notable, therefore, that I struggle to

communicate the intricacies and extent of these associations because it underlines the impossible-to-comprehend complexities and associations of Lambeth's database systems, where any view of data emerges with a myriad of processes, humans, and technical components.

With the new SPV, I knowingly employed the aesthetic of birch plywood − a ubiquitous material in the world of design − to make the SPV more visible as an art or design object within academic and creative circles. I came to recognise how this technical and aesthetic decision met aspirations for my career, as it helped to distribute this project through academic conferences such as a *Social Art Summit* in Sheffield (2018) and contributed to my winning the Warden's Public Engagement Award (Goldsmiths University of London, 2018) − prompting one resident to comment that the award was "a win for all of us." While I am obviously proud of this recognition, I do not aim to boast. Rather, I draw attention to my honesty with residents about my career aspirations, which developed trust and a space of mutual support. Such trust is unimaginable within Lambeth's existing maintenance, repair, and regeneration practices and invites questions of how a database system could enact trust through better visibility, accountability, and meaningful human contact − through the kinds of consultations enacted by @SaveCressingham in our development of an alternative plan for demolition (Cressingham Residents, 2016) (see fig. 118.).

Figure 118. *Outside workshop organised by @SaveCressingham. Presenting and discussing alternative plans to demolition. Image:The Peoples Plan.*

Figure 119. *Inspecting repairs on Cressingham with the SPV and my children.*

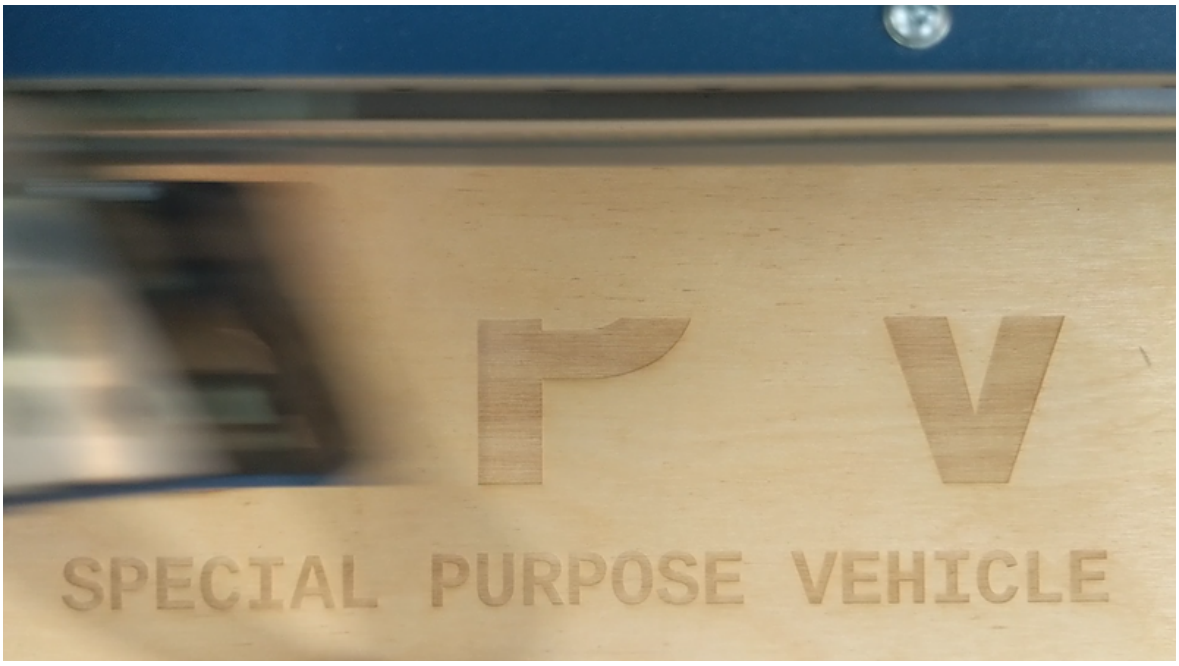


Figure 120. *Still from video footage recording the machine-process of laser cut lettering.*

Figure 121. *A chat in Brockwell Park with a resident of a neighbouring estate.*

The birch plywood aesthetic made little difference on Cressingham, as residents already found the old trailer strange and amusing (see fig. 122.); it thus performed its function as a conversational space (see fig. 121.). Outside Cressingham, however, in activist marches, or when using the trailer for my everyday shopping trips, the professionalism of the SPV drew people to ask where they could buy it. These encounters presented opportunities to garner support for @SaveCressingham. These aesthetic concerns also caused me to reflect on the gloss of Lambeth's consultation documents that feel more orientated towards a housing market than residents' needs and aspirations for their homes.

With the new SPV, I still struggled to film, record audio, speak with residents, audit repairs, and look after my children. I often lost control of the pole. The camera accidentally captured footage of green spaces and other uncategorised locations, and in doing so captured more information about Cressingham than a repairs job. Twice, the camera ran out of battery, so I filmed for two hours without obtaining any footage. I found it impossible to find time to prepare and *tag* video, which required that I manually type in over three hundred entries, not wanting to burden already-overstretched residents. These struggles caused me to slow down to instead focus on taking care of my children, having conversations with residents, and communicating any repairs issues through the informal networks of CGRMC. After all, I was not seeking a technical vision of perfection: rather, I wanted to observe and resist my desire to fix and make a *better* machine to instead focus on its social connections and construction.

With the SPV, I identified almost fifty refurbished and empty homes on Cressingham, one of which was previously covered in black mould that had forced a tenant to leave. This and other homes are now rented as temporary council tenancies, private rentals, or to property guardians, with others left empty to provide *decant space* for staged demolition (see fig. 123.). These homes are a product of shifting categorisations that dismantle intricate human relations and support networks that take years to form. As campaigners and scholars argue (e.g., London Tenants Federation et al., 2014; Crawford et al., 2014, p.62), the social and environmental costs of regeneration such as the mental and physical health issues caused by the stress of leaving an area, loss of green space, and the carbon impact of demolition are poorly understood or ignored within redevelopment calculations.

Working with the SPV and Shadow Database demanded care, attention, and a sensitivity to Cressingham residents. For example, as I encountered some distressing levels of disrepair while walking around Cressingham, I considered the ethics of garnering outside support to inspect repairs. I was aware this would threaten CGRMC's Right to Manage process because repairs data were protected by GDPR, and add stress to my family life because of concerns over legal action against me.

When I subsequently talked and walked with CGRMC committee members (see fig. 112.). I realised that the group were already aware of the worst instances of disrepair through informal networks. The Shadow Database video or new forms of categorisation were therefore not necessary to identify residents' distress. I do not provide this example to claim that databases are not important. – they

are, in fact, as they provide a record of accountability. However, my experience of Cressingham is that residents need machines and controls that are better-optimised towards the maintenance and care of buildings, the environment, and people. Specifically, my work with the Shadow Database and SVP identified that residents need to enact controls over maintenance, or indeed regeneration, practices in a continuous democratic process. Anything less is a facade of democratic engagement because one-off democratic events involve views and data that no longer matter after politicians have made their decisions.

Figure 122. *Talking to a resident about drainage issues.*

Conclusion

In this chapter, I expanded my concept of the aspirational database to consider how government database systems configure network views and controls over the urban environment in a space between metric precision and ambiguity. I turned to Foucault's concepts of a diagram of power and the gaze to frame Lambeth's databases as multiple scales of power exercised through exact observation. I then turned to Simondon's concepts of technicity and milieu to articulate how technical objects generate demands that produce unintended outcomes. Through these concepts, I argued that Lambeth's housing databases are a performative process of resolving tensions between technical objects and their associated milieu of UK government housing datasets, decent homes and space standards, to the scale of Lambeth's financial models and primary keys.

Figure 123. *Refurbished flat on Cressingham once covered in black mould.*

My discussion of the Shadow Database exposed how views of Lambeth's housing data are a function of technical configuration, human error, misunderstanding, overwork, legislation, and party-politics, which undermines ideas of its objective status. Through my analysis of a dropdown component of the Regen Calculator, I discussed how incoming categories of tenure and financial viability render residents' homes and lives invisible within cabinet decisions as well as government aspirations for affordable homes and mixed communities. I also examined how the SPV bicycle trailer made human and computational labour visible, elevated emotion, and drew attention to democratic

events in Lambeth to present marginalised residents' views of Cressingham as a place that is tacitly understood and lived in.

These research activities identified how issues of democratic accountability might be addressed through resident-led database views and controls. Here, concepts of a diagram of power and a database view exposed how Lambeth's databases are a process of recategorising urban space and excluding resident knowledge. Further, concepts of technicity and milieu allowed me to recognise the potential for alternative views and controls that focused on ethical concerns. It was essential that I did not dismiss the role of politicians or other humans in my analyses. Instead, I thought-through how technical configurations might enact a continuous mode of democracy that could realise residents' aspirations for decent and affordable homes beyond the limits of one-off cabinet decisions.

Chapter 7.
Towards an ethical database

An evolving campaign

At the time of writing this conclusion, all 306 homes on Cressingham are still under threat of demolition and the @SaveCressingham campaign is preparing for further legal action. In 2021, Homes for Lambeth, the council's SPV, submitted a successful planning application for the *Trinity Rise Development* that aims to demolish twelve homes on Cressingham. @SaveCressingham applied for and were granted a Judicial Review into Lambeth's approval of this planning application.

Rather than go to Judicial Review, Lambeth's planning department decided to quash their planning permission and allow Homes for Lambeth to resubmit their application. However, the council passed the resubmitted application in November 2021. The @SaveCressingham legal challenge focused on the lack of consideration given to the heritage aspects of the planning application and whether the council had properly considered English Heritages' (2014, p.4) suggestion of incorporating the estate within the boundary of the Brockwell Park Conservation Area. This judicial review would have been @SaveCressingham's third instigated against the council.

Homes for Lambeth instigated a consultation over the Trinity Rise Development in the lead-up to Christmas 2020. The consultation was restricted by the coronavirus pandemic, which prevented physical meetings and was a time of great stress. Six well-known elderly Cressingham residents were killed by the coronavirus, two of whom were my close neighbours. The primary consultation event was conducted online via a video-stream involving presentations from planning consultants Savills, architectural and design practice Conran+Partners, landscape architects Churchman Thornhill Finch, and community consultation company Your Shout, a subsidiary of Thorncliffe communications who were embroiled in a £1bn development housing development scandal involving a Conservative Party donor and the MP Robert Jenrick.

Campaigners described the online event as a cynical attempt to ensure as little response and engagement from residents as possible, complaining that residents could not ask direct questions of presenters using the online interface, were unable to physically meet which particularly impacted elderly residents; and did not participate in the design of new home in contravention of Lambeth's Key Guarantees (Lambeth Borough Council, 2017b). Residents also complained that the consultants employed by Homes for Lambeth had little or no connection to the borough and aimed to push through proposals at a huge expense.

Lambeth's (2020) database-backed Planning Portal established that out of 514 public comments on the Trinity Rise Development application, 508 were against the proposal and only 3 were in favour. Objections to the application came from campaigners, residents, and supporters of @SaveCressingham, including the 20th Century Society, Save Britain's Heritage, Brixton Neighbourhood Forum, Brixton Society, Friends of Brockwell Park, Brockwell Park Community Partners, and Herne Hill Society. The objectors variously argued that the planning application sought to "salami-slice" the

estate by securing approval for piecemeal demolitions and failing to publish the master-plan for redevelopment that Lambeth had commissioned for £800,000; disregards environmental concerns by proposing to demolish rather than refurbish buildings; will see the loss of three mature trees including a significant English oak; was insensitive to the skyline of Brockwell park and the architectural continuity of surrounding buildings; and will evict a vulnerable 83-year-old retired nurse against her will. Notably, three Labour Party Councillors objected to the resubmitted application, marking a political shift as, since 2012, only one Labour Councillor had expressed public support for @SaveCressingham's cause.

CGRMC continue to enact the Right to Manage and ensure that Lambeth maintains homes on Cressingham ahead of any transfer of housing services. CGRM are finalising the build of a dedicated office space on Cressingham, repurposing the Rotunda community space and garages for the use of future CGRMC employees, and agreeing on contractual obligations with the council. At this moment, CGRMC employs an estate manager to whom Lambeth has assigned direct access to their Northgate housing database. Furthermore, CGRMC continues to progress plans for their Right to Transfer and estimate that CGRMC will need to raise around £4.2m to transfer Cressingham into community ownership.

Research and activism in everyday life

Having provided a brief summary of the current status of the @SaveCressingham campaign, I now reflect on the theoretical, methodological, and empirical contributions of this research and discuss possibilities for its further development. In this discussion, I focus on three key themes of *multiplicity*, *ambiguity*, and *accountability* and reference subsidiary themes of *acceleration*, *precision*, and *labour* that carry through this thesis. This first section revisits the research questions and discusses these themes in relation to the concept of the *aspirational database* and method of *artist and activist-led research* developed through the introduction, literature review, and methodology chapters. In the second section, I discuss the empirical outcomes of this project, the insights they provide in relation to the key themes, and the readership of this thesis. In the final section, I identify new methodological and theoretical directions for the project that intersect the worlds of academia, activism, and critical approaches to making with technology.

Coping with multiplicity

As an artist, designer, and programmer, I was well-versed in thinking and making *with* technical objects as part of a critical technical practice (CTP) that incorporated art as a method of enquiry to comprehend the social and cultural implications of technology (Agre, 1997; Harwood, 2019). However, while my understanding of a CTP guided the initial stages of this project, it did not equip me to deal with the ambiguities of Lambeth's databases and their multiplicity of association that I encountered as I contributed to a fast-evolving activist campaign. These difficulties led to me to pose

the primary research question at the beginning of this thesis of: *how can thinking and acting with housing database technologies reveal and intervene in issues of participation and democracy within processes of urban regeneration?* My response to this question took shape in artist and activist-led research methods and the concept of the aspirational database, which allowed me to address Lambeth's databases as heterogeneous socio-technical processes involving human and technical components.

In the introductory chapter, I discussed how Lambeth's database systems are impossible to describe in their entirety because of their invisibility, inaccessibility, continually evolving status, as well as their multiplicity of human and technical association. I illustrated this multiplicity through a list of almost three hundred technologies used within Lambeth's administration (see fig. 7.), a diagram listing versions of democratic participation on Cressingham (see fig. 10.), and a discussion of a technical definition of an abstract relational model, and my various roles as an academic researcher, resident of Cressingham, @SaveCressingham activist, husband, writer, programmer, artist, father, and person facing the loss of their family home. In setting out the context of this project, I argued for a research practice that considers a database through multiple registers that can be technical, intra-personal, democratic, material, abstract, legislative, cultural, historical, political, ethical, and more.

In undertaking this work, I realised that I could not separate my research from my activist and personal endeavours. Driven by the concept of the aspirational database, I began to employ the term *activity* as a key methodological device to articulate how different domains of thought and action produce particular kinds of knowledge about database systems that are multiple, out-of-view, continually evolving, and embody multiple timescales and registers. My use of "activity" also helped connect with and develop Simondon's concept of technicity by underlining that database systems, with their human and technical components, are processes that construct the social and material environments in which they also participate. Examples of activity included writing code, preparing spreadsheets, researching histories and theories of database technologies, creating databases, and building a bike trailer on Cressingham to help audit repairs.

The concept of the aspirational database, developed through chapter two, was substantively informed by a combination of activities involving research on the history of the database (Codd, 1970; Jardine, 1977; Fortune, 2014); analysis of the development of global information systems and forms of categorisation as modes of control (Beniger, 1986; Krajewski, 2011; Bowker and Star, 2000); a poetic exercise and programming code that explored Lambeth's *Local Democracy* events calendar (see chapter four); reading literature that conceptualised the agency of technical objects and algorithms (Simondon, 2016; Hui, 2016; Goffey, 2008); creating lists as *lookup_tables* to cope with a mass of information (see chapter four); and an exploration of concepts to articulate databases in terms of governance and control (Foucault, 1969, 1975).

Allowing for ambiguity

In chapter two, I drew on theoretical resources from the domains of software studies, media theory, media archaeology, and STS to help unpack the status, power, and ambiguities, associated with databases, software code, and networks. Key contributors, included Dourish (2014), Harwood (2013), Kitchin (2011), Mackenzie (2002), Munster (2013), and Nadim (2012), who help underline how databases can be understood as many things at once, including collections of data, technical terms in computer science, abstract models, entire database management systems, GUI, network infrastructure, algorithms, workplaces, archives, contractual arrangements, or an assemblage of prior concepts and technologies. I also drew from urban studies scholars (e.g., Watt and Minton, 2016; London Tenants Federation et al., 2014), activist groups (e.g., Southwark Notes, Architects for Social Housing), and scholars who connect studies of urbanism and technology (e.g., Graham and Marvin, 1996; Mattern, 2021; Easton et al., 2019) to help unpack the language and socio-technical implications of urban regeneration. These theoretical resources allowed for ambiguity when describing database systems, which challenges a typical computer-science understanding of a database as an object that can be described in definitive terms. Inventing the fictional acronym HARMS, therefore, was essential to address the ambiguous and unknowable aspects of Lambeth's databases, point to anything that *felt* associated with them, and acknowledge that distinction between what is technical, human, social, or cultural is not always clear.

The concept of the aspirational database expands a typical understanding of a database as a neutral agent. Before developing this concept, my analysis was restricted to the separate domains of computer-science, normative party-political discussions, or activist attempts to identify the truth of Lambeth's housing data. Accordingly, the aspirational database opened a consideration of the database beyond technical concerns to recognise their performativity as they shape human aspirations to accelerate flows of data, regulate work, distribute accountability, and enact control through specific fields of attention. Again, developing the idea of technicity was key to this conceptualisation, where the directive capacities of both human aspiration and the characteristics of technical objects were placed in the same hierarchy to articulate a technical politics of urban regeneration. In summary, the aspirational database combined multiple concepts to articulate a database as the collective endeavour of humans and machines to systematically gather information (Harwood, 2013); a machine that produces *statements* or *institutional truths* that are more fact of their associations within a *discursive space* than objective truth (Foucault, 2002, p.136); and the optimisation of human and technical components driven by an inherent technicity (Simondon, 2016, pp.26, 72). This conceptualisation facilitates a mode of thought and action that can explore how database systems add to and are productive of the sites and politics of urban regeneration.

The idea − contained within the concept of technicity − that a database is a human-machine process of resolving the tensions between multiple interests and demands be they legislative, economic,

ideological, technical, or individual, is core to the concept of the aspirational database. It explains a power dynamic where technical objects impart a human desire change which helped to address a subsidiary question posed in this thesis: *how can artist and activist-led research explain conflicting aspirations within Lambeth to repair, demolish, and displace?* Such conflicts are evident in staff who desire to address repairs and others who do not care; politicians who are whipped to follow a party-political line while claiming to represent communities; contractors aiming to maximise profit; technicians accelerating throughput of Repairs Jobs (as data) with little understanding of quality; categorisations of a *decent home* and *mixed communities* enacted through legislation that works to both refurbish and demolish homes; and political strategy predicated on raising land-value by demolishing, rebuilding, and adding council and private homes that displaces existing communities. Such conflicts present an ambiguous power dynamic that cannot be explained as a singular product of left or right-wing politics which invites the exploration of how database systems produce a site of often-indecipherable political, commercial, or individual opportunism and error.

Through the methodology chapter, I argued that the societal and cultural implications of database technologies are revealed through technical minutia that configures relations between government, residents, and homes within maintenance and regeneration practices. Making and thinking with the components of database technologies, human or otherwise, can thus expose how humans participate with and are governed through and by technical characteristics that are not easily understood or accessed, so they must be inferred. Art practice, therefore, is key because it allows for ambiguities that typical qualitative and quantitative research methods might exclude, while also providing space to experiment and point to an *experience* of urban regeneration that is difficult to communicate through other means.

Accountability and method

In the methodology chapter, I drew from the notion of a method assemblage (Law, 2004) to argue that typical social scientific methods such as observations, questionnaires, or interview cannot address the technical, intra-personal, abstract, and material realities or registers of database systems experienced within a live activist campaign. I devised methodology, therefore, that could address the heterogeneous, ambiguous, and more-than-technical components of local government databases. Central to this methodology was a CTP that incorporated art as a method of enquiry (Agre, 1994; Harwood, 2019). These methods also drew from traditions of action-research and participatory design (Trist and Bamforth, 1951; Masters, 1995; Asaro, 2000). This method assemblage provides a means to collate multiple narrative accounts of government databases in the form of text notes, programming code, diagrams, and audio and video that render the multivarious practices and registers visible, including those aspects that are barely perceived but are nevertheless felt.

Artist and activist-led research methods involve impartial and creative acts that knowingly blur the distinction between academic disciplines, theoretical research, art, design, activism, and personal

life, which can all be understood as sites of research and practice. This approach builds on a CTP by offering a novel means to reflect on practice as part of the practice itself. For example, the methods set out in chapter three of *Almost Workshops, defamiliarisation, building contraptions, dysfunction, engineering,* and *humour* collectively decentre my role as an academic or artist as a reflection on my institutional associations. This practice also invites reflection on notions of academic impartially, which are impossible to claim when contributing to an activist campaign that aspires to prevent the demolition of my and others' homes, while opening space for personal narrative and methods that address issues of social injustice rather than simply reporting on and analysing them.

As I reflect on these methods, I understand how they made different realities or registers of urban regeneration more or less visible. For example, my status as a homeowner excluded my understanding of tenants' experiences which became apparent in my work with the Service Charge Parser discussed in chapter four, where I discovered a lack of access to repairs data among tenants. Such exclusions underline a limitation of this methodology and the importance of the word *I* within this thesis, which communicates the situated nature of this project. I also learned that housing databases perform differently for researchers, tenants, homeowners, Lambeth staff, technical administrators, politicians, and contractors because each has access to different kinds of data, process, and knowledge about how data comes into existence. As such, situated and grounded research into government database systems can pull intimate relations with data and databases into sharp focus. While emotionally challenging, this examination provides important insights into the human impact and associations of database technologies that can flip between forms of ethical concern, co-option, or liberation from hierarchy and control (Asaro, 2000) for researchers as well as the subjects of research who exist within intersecting, differing, and at times conflicting frameworks of accountability and ethics.

This research methodology instigates a process of valuing and exposing residents' hidden labour, supporting collaborative efforts, and creating spaces of trust and honesty about researchers' own aspirations for their work. This methodology also works to challenge hierarchies of knowledge between philosophical theory, activism, art, design, local and national government, technical work, and residents' lived experiences, each of which, as argued in chapter three, perform different realities of databases and urban regeneration. A rejection of hierarchy works to problematise notions of *objective truth* typically associated with databases as well as within activist practices that aim to prove errors within the logics of government consultations. Ideas of objective truth can be problematic because the exact causes of regeneration are complex and unclear, and they also exclude an understanding of how the logics and aspirations expressed through financial models, democratic processes, and party-political strategy set limits on what can be known. Crucially, this research methodology and the methods it employs privide a basis to identify, speculate on, and experiment with alternative socio-technical configurations and modes of knowledge production that impart value to residents' knowledge of buildings, homes, and community that are excluded from the statements and views that emerge from government database systems.

Outcomes of figuring a database

The outcomes of this research project are difficult to describe in succinct terms. They have emerged from almost fifty intersecting artist and activist-led activities that generated over 300,000 files including spreadsheets, programming code, SQLite databases, images, video, PDFs, DOCX, HTML, and many installed as part of software applications to help manage or work with data. Chapters four to six discuss nine of these activities, which include: *An Impossible Code/Diagram*, *Cabinet Document Parser*, and *lookup_tables* discussed in chapter four; the *Service Charge Parser*, *Paper Houses and a Search Drill*, and *Spreadsheet Schema* discussed in chapter five; and the *Shadow Database*, *Regen Calculator*, and *Special Purpose Vehicle* discussed in chapter six. The thesis also refers to many subsidiary and intersecting activities, including the *Poetic URL*, *Regen Cheat Sheet*, *Land Value Plot*, *Import Code*, and *Regeneration Algorithm*. The combination of these activities presents a portrait or figuration of what it means to research and engage with government databases systems within processes of urban regeneration.

These titles, reminiscent of art objects, work to defamiliarise everyday acts of data management and point to a process of assembling relations between human and technical components and to expose, participate with, or intervene in Lambeth's database systems as they unfold. For example, the lookup_tables identified the scale of information and processes faced by residents, supported two Judicial Reviews against Lambeth, and documented struggles to maintain homes. The Service Charge Parser highlighted the labour and expertise required to contest over £127k worth of repairs. Paper Houses and a Search Drill provided a space of fun and dysfunction as a counterpoint to the accelerative capacities of Lambeth's systems. The Shadow Database and Regen Calculator highlighted the logics of council consultations and financial models that marginalise residents' concerns (see fig. 124.). Lastly, the Special Purpose Vehicle identified the demands that databases place on residents' lives.

Driven by the concept of the aspirational database, these activities trace an interplay between government databases systems and their *associated milieu* (Simondon, 2016, p.59) of legislation, party-politics, workers, contractors, campaigners, and residents. They expose how database technologies recursively impart ideas for their own optimisation and provide space to test a concept of how databases operate as *diagrams of power* (Foucault, 1995, p.171) that act on buildings and residents. They also helped to contest a council officer's statement that "Cressingham is too expensive to repair" and a party political claim that the council had built 1,000 council homes when the number turned out to be just thirteen. In sum, these activities operate as a form of physical notetaking, playful experimentation, activist endeavour, a theoretical test-ground, a space of ethical reflection, and attempts to bring democratically accountable databases into existence.

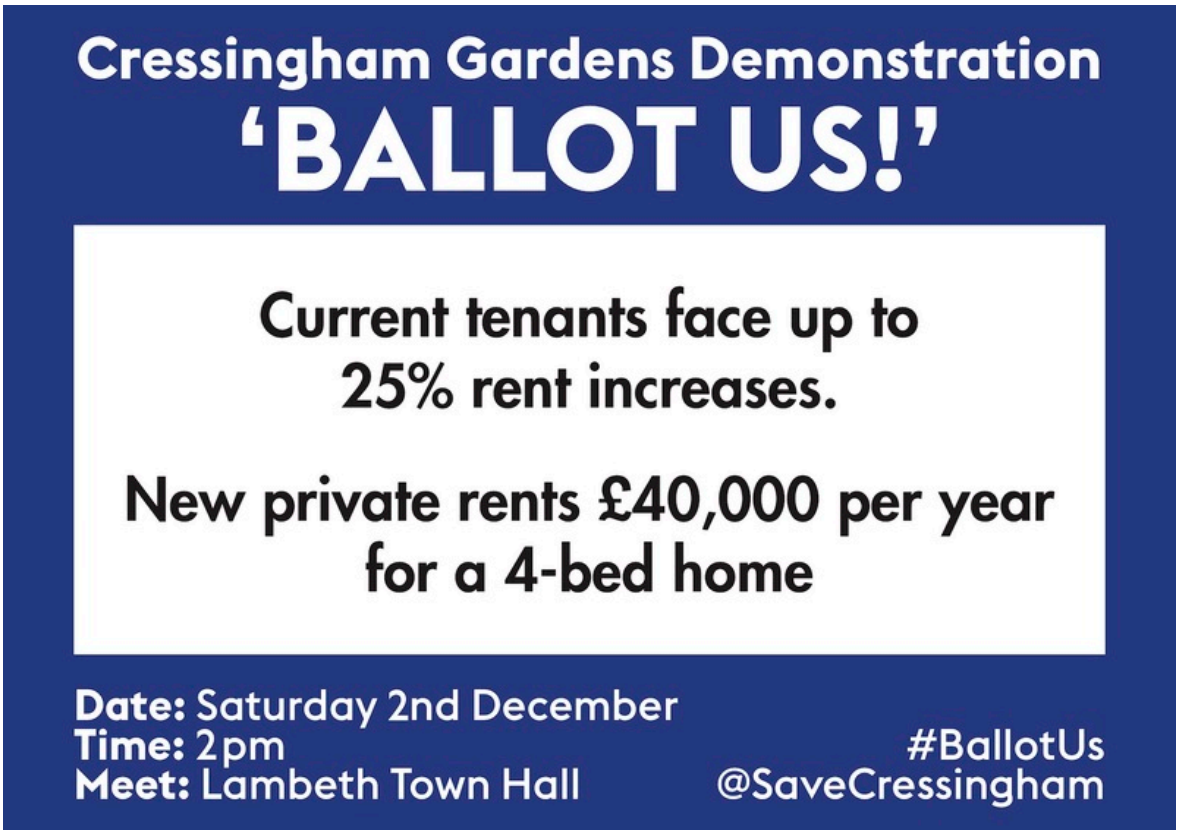


Figure 124. *Image produced for a @SaveCressingham protest. Figures based on work with the Regen Calculator.*

Exposing the multiplicity of process and association

Through chapter four, I discussed how the Impossible Code/Diagram, a URL from A Calendar View of democratic events, and the lookup_tables were formative in developing the concept of the aspirational database. I struggle to describe the intricacies of all the software applications, technical standards, configurations, categorisations, residents, workers, contractors, politicians, legislation, consultation events, maintenance and repairs processes, and consultation events I encountered within this project − where I was forced to infer database systems through council documents, reporting repairs, the speech and actions of Lambeth's workers, or feelings of frustration due to a lack of control, and access to humans or data. This struggle was intensified because databases evolve and are contingent on their associations and environment as well as my changing understanding of what they are comprised of and do. Through my attempts to describe these research activities, therefore, I learned to abandon my efforts to describe a database in definitive terms and accept their ambiguities and multiplicity − this was essential for the development of this project.

Working with simple lists while reflecting on theory, histories of technology, and undertaking activist work develops a mindset that can recognise and comprehend the unknowns of government database systems and the directive capacities of their components. The lookup_tables, for instance, were created by exposing a database as a list-architecture with origins in the earliest forms of writ-

ten language and industrialisation that find echoes in contemporary database systems. These lists exposed Lambeth's databases as sites of multiple temporalities that echo pre-database technologies and histories of data gathering in multiple layers of government that have undergone *successive phases* (2016, p.173) of structural reorganisation. This theoretical language is derived from Simondon and articulated the socio-technical evolution of government database systems and their function. Searching the origins of government database systems, therefore, is a process of becoming sensitive to their evolutionary status and agency that can accelerate and infinitely multiply, rearrange, retrieve, and distribute information, work practices, and controls over the urban environment.

In analysing the Spreadsheet Schema and Shadow Database as processes of deciphering hidden database schema, the directive capacities of primary keys become clear. Through this work, I could observe how primary keys can direct requests for data, govern the actions and responses of council workers, and multiply associations amongst departments, layers of government, institutions, and commerce by defining data relations between separate finance, housing, and asset management databases in Lambeth; UK government ordnance survey and land registry databases; and the UK housing market and postal service. Furthermore, I discovered that following the associations of primary keys points to their regulatory behaviour where, on Cressingham, they direct and monitor the actions of Lambeth's workers and contractors while instigating contractual, legislative, and commercial obligations between residents and Lambeth. I could argue, therefore, that primary keys and other abstract objects perform a power dynamic that overwhelms residents with information and structures how authority can think and act, while rendering potential views and controls over the urban environment invisible.

Producing ambiguity

Through the empirical chapters, I argued that the three layers of separation in the relational model generate a disconnect between residents, data, and those in positions of authority or control over data. Exploring the *external* layer through the examination of A Calendar View − involving a URL and network standards − exposed how database infrastructures fragment housing management practices across multiple departments and locations, which generates ambiguity and makes it near-impossible to hold individuals to account. Exploring the *conceptual* layer through the administrator's view of the Shadow Database identified the database as a site of potential views and controls. Exploring the *internal* layer by working with and observing the capacities of an SQLite data-store and schema accelerated activist work while slowing down Lambeth, which undermines the idea that government databases are apparatuses of total government control.

Configurations of power and knowledge came to the fore in the process of reverse-engineering inaccessible government databases while working closely with people directly affected by those systems. Building the Shadow Database, for example, confronted myself and CGRMC committee members with the ethical, legal, and democratic implications of working with databases as we

enacted rights to Manage and Transfer ownership of Cressingham into community hands. This research practice, therefore, provides an opportunity to shift focus from attempts to identify the truth of data to consider its ambiguities within technical processes and tightly controlled, one-off, democratic events that follow a party political-line. These activities also provide a space to reflect on how alternative socio-technical configurations might enact different versions of democracy by, for example, assigning residents direct veto power over maintenance, repairs, and regeneration practices.

Art practice does not carry the demands of activism or technical work for definitive explanation and thus centres on what residents *know* and *feel* about repairs, maintenance, and regeneration without always being able to explain exactly how or why. Producing or considering something to be art in this context is not primarily concerned with creating art objects for an exhibition or activist event − though does not preclude this outcome. Instead, this art is a process of figuring the *atmosphere* or feeling of database systems beyond their technical logic. For example, the scale rather than content of the lookup_tables point to a visceral experience of database systems, where power emerges from all directions and is not easily explained. Discussing and materialising SOR and Work Order Status codes through the Paper Houses and Search Drill event underlined how abstract *technical (digital) objects* (Hui, 2016) could produce a culture of disrepair and indifference to long-term maintenance and planning. Building the SPV bike trailer as a design or art object identified a database as a physical process that can marginalise and exclude residents' knowledge alongside ethical, environmental, and financial concerns.

Performance of accountability

Through my analysis of the research activities, I argued that in a very real sense, the material and abstract components of a database are suggestive of ideas for their own optimisation. This argument and the activities I undertook were guided by the notion that humans are coupling devices and inventors capable of resolving incompatibilities between machines (Simondon, 2016, xvi). I observed, for instance, the ways in which technical and more-than-technical errors and dysfunction directed the actions and ideas of myself and Lambeth's workers to optimise our work. In particular, building the SPV bike trailer (see fig. 125.) exposed tensions between the physically of a bike trailer, acts of filming and auditing, the demands of the Shadow Database with the work of CGRMC, @Save-Cressingham, and my commitments within academia and my home and family life, all of which shaped and were shaped by what the Shadow Database and SPV became. Observations like these point to the intricate relationships between government databases systems, the environments they operate on, and their associations with time, labour, expertise, funds, legislation, and more.

I came to realise how an examination of technical detail could expose the failure of party-political representation within repairs, maintenance, and regeneration practices. Working with work order status codes in the Shadow Database, Search Drill, and SPV bike trailer exposed how they shift the

labour of auditing repairs away from Lambeth onto residents, allowing contractors to self-regulate their work while ensuring that residents have no control over the performance of contractors' work. Contesting repairs data with the Service Charge Parser code exposed the limits of ward-level representation to address poor-quality repairs. Working with the Regen Calculator exposed financial models as calculations of social viability that are unaccountable to residents. Technical details like these underline how those in positions of authority and the data they view are far-removed from residents' understandings of what makes a decent home, life, or community.

Figure 125. *Painting the SPV trailer frame in my garden.*

The Shadow Database and SPV bike trailer exposed the limits of my conceptual framework where I connected an intersectional feminist analysis of power (D'Ignazio and Klein, 2020b; Haraway,

1988, p.576) with Foucault's concepts of a diagram of power and institutional truths. These conceptual resources added to the concept of the aspirational database to articulate the importance of a sense of community, feelings of security, humour, and well-being that are excluded from government databases and financial models. For example, working with the SPV allowed me to highlight the relationships between database systems, ideas of academic impartiality and my involvement in activist campaigns, and my personal aspirations for work and life. In doing so, I was able to raise important questions about academic impartiality, the ethics of *not* intervening as an academic, or who can engage with democratic processes. However, rather than providing definitive answers to these questions, this artist and activist-led research practice is open-ended and invites speculation and further explorations of what ethical and democratically accountable database systems might be by exposing how hierarchies and asymmetries of knowledge are performed.

A multidisciplinary readership

The interdisciplinary nature of this project means it connects with and contributes to multiple domains of thought and action both within and outside of academia. Practice-led academic researchers within the domains of art and design will find ways to integrate activist and socially engaged work through an assemblage of methods that address the complexities, ambiguities, materialities, and situatedness of abstract technologies. Urban studies scholars will find my resident account of technically mediated governance informative when considering issues of power, knowledge, and democracy within urban regeneration. Software developers will find ways to question the social and ethical implications of their work, as I did before I entered the world of academia. Activists will find techniques to expose both data and technical infrastructures and that pattern the inner workings and external actions of government.

Those writing social policy will find inspiration in the idea that databases make government and *governance* what it is, which imparts ideas of how to make technical systems more ethically accountable. It is notable, therefore, that a recently released UK Government (2021) Algorithmic Transparency Standard focuses on a transparency of algorithmic tools (with an emphasis on AI), though it does not address how to cede control to those worst affected by such technologies. I suggest, therefore, thinking beyond data access initiatives or providing information about technical systems to, instead propose forms of direct control and vetoes over decisions if technical systems no longer work for those they represent. These are complex considerations, however, because they involve questions of how to navigate risk, cede control, and address national concerns regarding of how to allocate resources within unfolding housing and environmental crises.

Theorists of technology, associated domains of software studies, STS, and sociology will be interested in my grounding of philosophical theory within a live activist setting. For example, my continual discussions in person, on social media and at political events with residents, campaign groups, politicians, and journalists provide the opportunity to test my theoretical lexicon. For in-

stance, I chose to use the term more-than-technical instead of more-than-human because the former felt less pompous within the context of such discussions. Likewise, the term *machine* connected with a colloquial understanding of party-political or government machinery, which helped communicate the ideas of this thesis to a broader audience through the activities I constructed.

Artists and designers who explore the social implications of technology, particularly those engaged with critical technical practice, will find resources in this project to critically reflect on their own work and its institutional and disciplinary associations. The project, for example, does not shy away from a criticism of the domains and disciplines of art, design, and academia that can extract from residents and activists but not contribute, in real terms, to the campaigns in which they are engaged. Accordingly, this project adds to a burgeoning domain of work that instigates and explores forms of multi-disciplinary scholar-activism such as that of the Goldsmiths-based research agency Forensic Architecture who investigate human rights violations, or work published within the Radical Housing Journal, which was established by thirteen scholar-activists in 2016.

Directions for future work

I conducted this research with the collective insight and knowledge of tenants, homeowners, and campaigners from different cultural backgrounds and levels of formal education. However, Lambeth councillors' attempts to discredit @SaveCressingham and CGRMC by claiming that middle-class homeowner interests drove the campaign, that it was not representative of black residents, or (in some instances) that male campaigners dominated panel discussions at activist and political events did not give due recognition to the individuals, range of lived experience, cultural background, and knowledge within @SaveCressingham, CGRMC, and on Cressingham. Through this project, my access and contribution to this knowledge was a deeply humbling experience that caused me to re-evaluate my own expertise.

Cressingham residents countered Lambeth's accusations by legitimising Cressingham's Peoples Plan (Cressingham Residents, 2016) and voting for a broad mix of CGRMC committee members to represent their interests. I recognised, however, how processes of urban regeneration perpetuate structural inequalities by ensuring that only those with resources such as time, access to expertise, or the opportunity to fund their existence can meaningfully participate in such processes. I was intensely aware, for instance, of my status as a middle-class white male homeowner living in ex-council housing with three years of academic funding. It is important to note, therefore, that I chose not to address categorisations of working/middle-class, black/white, homeowner/tenant, or gender because this would have added additional layers of complexity to an already complex project. As such, these are important issues that would benefit from a deeper consideration and an extension of the theoretical and methodological framework of this project.

Haraway's work would provide a starting point for a more reflexive approach to research that en-

gages head-on with my cultural status and its implication to researching issues of social injustice in relation to technology. Much can also be learned from increasingly visible working-class academics such as Lisa Mackenzie (2021) who has been vocal and active in her support for housing campaigns like that of Cressingham and has challenged normative modes of academic research and publication through her crowd-funded *Lockdown Diaries of the Working Class* project. Mackenzie draws from the work of philosopher Pierre Bourdieu (1977) to call for a research practice that is flexible and reflexive and avoids a methodology and ideology that alienates the subjects from their own testimony, arguing that academic language and publication routes can diminish the living, breathing quality of a working-class experience. These are pertinent issues to explore further for middle-class researchers such as myself undertaking work in sites such as Cressingham.

Drawing from the sociologist Mike Savage (2021), I can see opportunities to address cultural status in relation to government through his comparative analyses of Pierre Bourdieu, Foucault, and Marx to understand power and inequality in cultural terms. His work also connects with Simondon's (2016, pp.x111, 117, 133) discussion of alienation that critiques and develops Marxist analysis beyond a study of economic condition or ownership of property. Indeed, as Hui discusses (2018), Simondon (2016, p.233) provides a counter-point to Marx by addressing how to become closer to and more understanding of human-machine relations to avoid enslavement to "unknown and distant powers." These considerations strongly resonate with the themes of this thesis and pave the way towards more ethical and accountable modes of governance and control, or indeed, question raised by Hui (Hui, 2020) of how art can transform technology by nurturing our relationship to the unknown.

I am currently holding discussions with CGRMC committee members to establish a *creative space* on Cressingham involving novel forms of organisation, ownership, technology, and governance. Such a space would provide a strong base for exploring issues of technically mediated governance while supporting the aims of CGRMC and the efforts of activist campaigns in Lambeth and across London and the UK with which I have connected as part of this project. These campaigns unanimously communicate similar issues related to governance, party-political intervention, dissipation of accountability, and a lack of resources. The immediate concerns and aspirations of CGRMC are the creation of accountable and reliable database systems and the raising of funds to purchase Cressingham. My research aspirations are drawn to ideas (Verdegem, 2021; McQuillan, Forthcoming 2022) and experimentation regarding AI and other kinds of technology that are causing a phase-shift in government − including in the world of housing. Meanwhile, activist campaigns in Lambeth and beyond aspire to shift the way that government and political parties perform their work. These intersecting and conflicting aspirations provide a space for evolving the concept of the aspirational database as well as artistic and activist methods that result in egalitarian outcomes.

The establishment of a creative space − in the broadest sense of the term − would benefit from fur-

ther research on early Scandinavian *collective resources* (Asaro, 2000, p.265) approaches to design research projects, which were briefly mentioned in chapter three, to consider ways of collectively resourcing Cressingham and connected campaigns. Attention to the burgeoning scholarship that critiques the relationships between design research and notions of care (e.g., Pennington, Forthcoming 2022) or who gets to speculate about alternative futures outside of the safe spaces of academia, design, or art (Healy, 2020, p.107) would also prove instructive here, as would experimentation with emergent technologies and concepts like blockchains and distributed autonomous organisations (DAO) that carry potential − as recognised by artists, scholars, and technologists (e.g., Catlow et al., 2017; Ryan, 2021; Regine, 2021; Gomez, Rosenberg and Poon, 2021) for new forms of governance, for the regulation of collective resources, and for both utopian and dystopian futures. Experimental, fun, and grounded work on a site like Cressingham provides an opportunities to explore the function of new technologies while addressing issues of pressing social need.

Figure 126. *A window in Cressingham displaying support for the Peoples Plan.*

References

Abram, D., 1997. *The Spell of the Sensuous: Perception and Language in a More-than-human World*. Vintage Books.

Adam, S., Chandler, D., Hood, A. and Joyce, R., 2015. *Social housing in England: A survey*.

Adelman, C., 1993. Kurt Lewin and the Origins of Action Research. *Educational Action Research*, 1(1), pp.7–24.

Affordable Housing Commission, 2020. *Making Housing Affordable Again: Rebalancing the Nation's Housing System*.

Agre, P., 1994. Surveillance and capture: Two models of privacy. *The Information Society*, 10(2), pp.101–127.

Agre, P., 1997. *Computation and human experience*. Learning in doing. Cambridge University Press.

Agre, P., 1997. Toward a Critical Technical Practice: Lessons Learned in Trying to Reform AI. In: *Social Science, Technical Systems and Cooperative Work: The Great Divide*. Hillsdale: Erlbaum.

Airey Miller, 2015. *Estate Regeneration Programme - Draft Financial Viability Appraisal - Version 07*. Available at: <https://www.whatdotheyknow.com/request/viability_model> [Accessed 30 Oct. 2017].

American National Standards Institute, 1986. *Database language: SQL / Secretariat, Computer and Business Equipment Manufacturers Association.* American national standard for information systems. New York : Springfield, VA: American National Standards Institute.

Arch+, 2018. *Commoning Berlin*. *archplus*. Available at: <https://www.archplus.net/home/news/7,1-17236,1,0.html> [Accessed 2 Oct. 2018].

Architects for Social Housing, 2017. *Mapping London's Estate Regeneration Programme*. *Architects for Social Housing (ASH)*. Available at: <https://architectsforsocialhousing.co.uk/2017/09/10/mapping-londons-estate-regeneration-programme/> [Accessed 16 Oct. 2017].

Architects for Social Housing, 2017a. *Social Housing: Demolitions, Privatisations & Social Cleansing*. *architectsforsocialhousing*. Available at: <https://architectsforsocialhousing.co.uk/2017/05/13/social-housing-demolitions-privatisations-social-cleansing/> [Accessed 9 Apr. 2019].

Architects for Social Housing, 2017b. *The Truth about Grenfell Tower*. *Architects For Social Housing*. Available at: <https://architectsforsocialhousing.wordpress.com/2017/07/21/the-truth-about-grenfell-tower-a-report-by-architects-for-social-housing/> [Accessed 2 Aug. 2017].

Asaro, P.M., 2000. Transforming society by transforming technology: The science and politics of participatory design. *Accounting, Management and Information Technologies*, 10(4), pp.257–290.

Baird, D., 2004. *Thing knowledge: A philosophy of scientific instruments*. Berkeley, Calif: University of California Press.

Ball, M., Edwards, M. and Folin, M. eds., 2018. *LAND RENT, HOUSING AND URBAN PLANNING: A european perspective.* Place of publication not identified: ROUTLEDGE.

Bardin, A., Carrozzini, G., Rodríguez, P. and DePaul University, 2019. The Work of Simondon: Introduction to the Special Issue. *Philosophy Today*, 63(3), pp.567–570.

Barron, C., 2003. A strong distinction between humans and non-humans is no longer required for research purposes: A debate between Bruno Latour and Steve Fuller. *History Of The Human Sciences*, 16(2), pp.77–99.

Barry, A., 2001. *Political Machines: Governing a Technological Society*. A&C Black.

Barry, A., Born, G. and Weszkalnys, G., 2008. Logics of interdisciplinarity. *Economy and Society*, 37(1), pp.20–49.

BBC News, 2017. *Grenfell death toll 'may be below 80'*. *BBC News*. Available at: <http://www.bbc.co.uk/news/uk-41318828> [Accessed 22 Sep. 2017].

Beniger, J., 1986. *The Control Revolution*. Harvard University Press.

Berlant, L., 2011. *Cruel Optimism*. Duke University Press.

Berners-Lee, T., 2009. *Putting Government Data online - Design Issues*. Available at: <https://www.w3.org/DesignIssues/GovData.html> [Accessed 26 Apr. 2017].

Beswick, J. and Penny, J., 2018. Demolishing the Present to Sell off the Future? The Emergence of "Financialized Municipal Entrepreneurialism" in London. *International Journal of Urban and Regional Research*, 42(4), pp.612–632.

Bogers, L. and Chiappini, L., 2019. *The Critical Makers Reader: (Un)learning Technology*. Institute of Network Cultures.

Bokrosova v London Borough of Lambeth, 2015. *Mrs Justice Elisabeth Laing*.

Bolter, J.D. and Grusin, R.A., 1999. *Remediation: Understanding new media*. Cambridge, Mass: MIT Press.

Boughton, J., 2019. *Municiple dreams: The rise and fall of council housing.* Verso.

Bourdieu, P., 1977. *Outline of a Theory of Practice*. Cambridge Studies in Social and Cultural Anthropology. Translated by R. Nice. Cambridge: Cambridge University Press.

Bowker, G.C. and Star, S.L., 1996. How things (actor-net) work: Classification, magic and the ubiquity of standards. *Philosophia*, 25(3-4), pp.195–220.

Bowker, G.C. and Star, S.L., 2000. *Sorting Things Out: Classification and Its Consequences*. MIT Press.

Boyd, A. and Mitchell, D.O., 2013. *Beautiful Trouble: A Toolbox For Revolution (Pocket Edition)*. OR Books.

Bradbury, V. and O'Hara, S. eds., 2020. *Art hack practice: Critical intersections of art, innovation and the maker movement*. New York, NY: Focal Press.

Brathwait, R., 1613. *The Yong Mans Gleanings*.

Bunting, H., 2014. *The Status Project.* Available at: <http://status.irational.org/> [Accessed 2 Aug. 2019].

Buzz, B., 2018. *Lambeth puts elderly residents at risk in Macintosh Court in Streatham*. *Brixton Buzz*. Available at: <http://www.brixtonbuzz.com/2018/09/lambeth-puts-residents-at-risk-in-macintosh-court-in-streatham/> [Accessed 7 May 2019].

Callon, M., 1986. Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay. In: *Power, action and belief: A new sociology of knowledge?* Routledge, pp.196–233.

Callon, M. and Law, J., 1982. On Interests and Their Transformation: Enrolment and Counter-Enrolment. *Social Studies of Science*, 12(4), pp.615–625.

Callon, M., Law, J. and Rip, A. eds., 1998. *Mapping the dynamics of science and technology: Sociology of science in the real world*. transferred to digital printing ed. Houndmills: Macmillan.

Canguilhem, G., 1989. *The Normal and the Pathological*. The MIT Press.

Canguilhem, G., 2001. The living and its milieu. *Grey Room*, (03), pp.7–31.

Care & Repair England, 2019. *Housing disrepair: Improving non-decent homes*.

Catlow, R., Garrett, M., Jones, N. and Skinner, S. eds., 2017. *Artists re:thinking the blockchain*.

Chabot, P., 2013. *The Philosophy of Simondon: Between Technology and Individuation*. A&C Black.

Christophers, B., 2014. Wild Dragons in the City: Urban Political Economy, Affordable Housing Development and the Performative World-making of Economic Models: Performative world-making of economic models, UK case. *International Journal of Urban and Regional Research*, 38(1), pp.79–97.

Clerk, A. and Chalmers, D.J., 1998. The Extended Mind.

Cobb, J., 2018a. *Lambeth Council asks for FOI email to be deleted as People's Audit shines light on estate regeneration finances*. *Brixton Buzz*. Available at: <https://www.brixtonbuzz.com/2018/03/lambeth-council-asks-for-foi-email-to-be-deleted-as-peoples-audit-shines-light-on-estate-regeneration-finances/> [Accessed 24 Sep. 2021].

Cobb, J., 2018b. *People's Audit question transparency at Lambeth Council after information blocked from residents*. *Brixton Buzz*. Available at: <https://www.brixtonbuzz.com/2018/08/peoples-audit-question-transparency-at-lambeth-council-after-information-blocked-from-residents/> [Accessed 19 Jul. 2021].

Codd, E., 1970. A Relational Model of Data for Large Shared Data Banks. *Communications of the ACM*, 13(6), pp.377–387.

Colakides, Y., Garrett, M. and Gloerich, I. eds., 2019. *State machines: Reflections and actions at the edge of digital citizenship, finance, and art*. Amsterdam: Institute of Network Cultures.

Combes, M., 1999. *Gilbert Simondon and the Philosophy of the Transindividual*. MIT Press.

Corby, T., 2006. *Network art: Practices and position*. London: Routledge.

Crawford, K., Johnson, C., Davies, F., Joo, S. and Bell, S., 2014. *Demolition or Refurbishment of Social Housing? A review of the evidence*. UCL Engineering, Urban Lab.

Cressingham Residents, 2016. *The Peoples Plan*. [online] Available at: <http://www.cressinghampeoplesplan.org.uk> [Accessed 26 Oct. 2016].

Critical Art Ensemble, 2001. *Digital resistance: Explorations in tactical media*. Autonomedia.

Cuffe, G., 2021. *Council to be investigated over handling of complaints*. *Wandsworth Times*. Available at: <https://www.wandsworthguardian.co.uk/news/19301053.housing-ombudsman-probe-lambeth-council-complaints/> [Accessed 11 Jun. 2021].

D'Ignazio, C. and Klein, L.F., 2020a. *Data Feminism*. Strong Ideas. Cambridge, MA, USA: MIT Press.

D'Ignazio, C. and Klein, L.F., 2020b. Seven intersectional feminist principles for equitable and actionable COVID-19 data. *Big Data & Society*, 7(2).

De Vries, M., 2008. Gilbert Simondon and the Dual Nature of Technical Artifacts. *Techné: Research in Philosophy and Technology*, 12(1).

Debaty, R., 2017. *Exploitation Forensics. Interview with Vladan Joler – We Make Money Not Art*. Available at: <https://we-make-money-not-art.com/exploitation-forensics-interview-with-vladan-joler/> [Accessed 2 Aug. 2019].

Deleuze, G., 1988. *Foucault*. Translated by S. Hand. Minneapolis: University of Minnesota Press.

Deleuze, G., 2001. Review of Gilbert Simondon's L'individu et sa genese physico-biologique (1966). In: *Pli*. pp.43–49.

Dicks, B., 2014. Participatory Community Regeneration: A Discussion of Risks, Accountability and Crisis in Devolved Wales. *Urban Studies*, 51(5), pp.959–977.

Douglas, P. and Parkes, J., 2016. "Regeneration" and "consultation" at a Lambeth council estate. *City*.

Dourish, P., 2014. No SQL: The Shifting Materialities of Database Technology. *Computational Culture: a Journal of Software Studies*, (Four).

Dreams, M., 2014a. *Cressingham Gardens, Lambeth: "A sense of smallness inside the bigness"*. *Municipal Dreams*. Available at: <https://municipaldreams.wordpress.com/2014/09/09/cressingham-gardens-lambeth/> [Accessed 9 Jun. 2021].

Dreams, M., 2014b. *Cressingham Gardens, Lambeth: "Warm and informal…one of the nicest small schemes in England"*. *Municipal Dreams*. Available at: <https://municipaldreams.wordpress.com/2014/09/16/cressingham-gardens-lambeth-2/> [Accessed 17 Mar. 2017].

Dumouchel, P., 1992. Gilbert Simondon's plea for a philosophy of technology. *Inquiry*, 35(3-4), pp.407–421.

Easton, S., Lees, L., Hubbard, P. and Tate, N., 2019. Measuring and mapping displacement: The problem of quantification in the battle against gentrification. *Urban Studies*.

Edwards, M., 2016. The housing crisis and London. *City*, 20(2), pp.222–237.

Edwards, P.N., 1997. *The closed world: Computers and the politics of discourse in Cold War America*. First MIT Pr. Paperb. ed ed. Inside technology. Cambridge, Mass. London: MIT.

Ehn, P., 2008. Participation in Design Things. In: *Proceedings of Participatory Design Conference (PDC)*. Bloomington, Indiana, USA, 2008.

Elliott-Cooper, A., Hubbard, P. and Lees, L., 2019. Moving beyond Marcuse: Gentrification, displacement and the violence of un-homing. *Progress in Human Geography*.

English Heritage, 2014. *Cressingham Gardens: Case Number: 1415845*.

Fairbairn, B., 1994. The Meaning of Rochdale: The Rochdale Pioneers and the Co-operative Principles.

Farías, I. and Bender, T. eds., 2011. *Urban assemblages: How actor-network theory changes urban studies*. First issued in paperback ed. Questioning cities series. London New York: Routledge, Taylor & Francis Group.

Ferry, G., 2003. *A Computer Called LEO: Lyons Tea Shops and the World's First Office Computer*. HarperCollins UK.

Fortune, S., 2014. A Brief History of Databases. *Avant*.

Foucault, M., 1969. *L'archéologie du savoir*. Paris: Gallimard.

Foucault, M., 1975. *Surveiller et punir : Naissance de la prison*. Paris: Gallimard.

Foucault, M., 1980. *Power/knowledge: Selected interviews and other writings, 1972-1977*. 1st American ed ed. New York: Pantheon Books.

Foucault, M., 1995. *Discipline and punish: The birth of the prison*. 2nd Vintage Books ed. New York: Vintage Books.

Foucault, M., 2002. *Archaeology of knowledge*. Routledge classics. London ; New York: Routledge.

Foucault, M., 2008. *The Birth of Biopolitics: Lectures at the Collège de France, 1978-1979: Lectures at the College De France, 1978-1979*. Translated by M.G. Burchell. Palgrave Macmillan.

Foucault, M., 2009. *Security Territory Population: Lectures at the Collège de France, 1977-1978*. Picador/Palgrave.

Franklin, U.M., 1990. *The real world of technology*. CBC Massey lectures series. Toronto, Ont. : Berkeley, CA: House of Anansi Press.

Fuller, M., 2007. *Media ecologies: Materialist energies in art and technoculture*. Leonardo. Cambridge, Mass. London: MIT.

Fuller, M. ed., 2008. *Software Studies: A Lexicon*. MIT Press.

Fuller, M. and Goffey, A., 2012. *Evil media*. Cambridge, Mass: MIT Press.

Furtherfield, 2008. *DIWO - Do It With Others Resource*. *Furtherfield*. Available at: <https://www.furtherfield.org/diwo-do-it-with-others-resource/> [Accessed 2 Jun. 2020].

Galloway, A.R. and Thacker, E., 2007. *The exploit: A theory of networks*. Electronic mediations. Minneapolis: University of Minnesota Press.

Garcia, D. and Geert, L., 1997. *The ABC of Tactical Media*. Available at: <https://www.nettime.org/Lists-Archives/nettime-l-9705/msg00096.html> [Accessed 30 Sep. 2019].

Gaver, B. and Bowers, J., 2012. Annotated portfolios. *interactions*, 19(4), pp.40–49.

Gillespie, T., 2014. The Relevance of Algorithms. In: *Media Technologies: Essays on Communication, Materiality, and Society*. p.167.

Gitelman, L. ed., 2013. *"Raw data" is an oxymoron*. Infrastructures series. Cambridge, Massachusetts ; London, England: The MIT Press.

Goffey, A., 2008. Algorithm. In: *Software Studies: A Lexicon*. MIT Press.

Goldsmiths University of London, 2018. *Warden's Annual Public Engagement Awards 2018*. Available at: <www.gold.ac.uk/media/documents-by-section/research-and-enterprise/2018-Wardens-Annual-Public-Engagement-Awards-programme.pdf> [Accessed 10 Oct. 2018].

Gomez, M., Rosenberg, J. and Poon, C., 2021. *The Eightfold Path to DAOism*. Available at: <https://orca.mirror.xyz/WVB26-PtNp8D_7A7DXNPhnOMEHnPrEP2NgJc0nRAqwo> [Accessed 5 Dec. 2021].

Gorur, R., Hamilton, M., Lundahl, C. and Sjödin, E.S., 2019. Politics by other means? STS and research in education. *Discourse: Studies in the Cultural Politics of Education*, 40(1), pp.1–15.

Graham, S. and Marvin, S., 1996. *Telecommunications and the City: Electronic Spaces, Urban Places*. Psychology Press.

Graham, S. and Marvin, S., 2001. *Splintering urbanism: Networked infrastructures, technological mobilities and the urban condition*. London;New York: Routledge.

Grenfell Action Group, 2017. *KCTMO – Playing with fire! Grenfell Action Group*. Available at: <https://grenfellactiongroup.wordpress.com/2016/11/20/kctmo-playing-with-fire/> [Accessed 15 Aug. 2017].

Guérin, D. ed., 2005. *No gods, no masters*. Complete unabridged ed ed. Translated by P. Sharkey. Edinburgh, Scotland ; Oakland, CA: AK Press.

Haraway, D., 1988. Situated Knowledges: The Science Question in Femanism and the privilage of Partial Perspective. 14(3), pp.575–599.

Harwood, G., 2013. *Database Machinery as Cultural Object, Art as Enquiry*. PhD thesis.

Harwood, G., 2019. Teaching Critical Technical Practice. In: *The Critical Makers Reader: (Un)learning Technology*. Institute of Network Cultures, pp.29–37.

Hayward, M. and Geoghegan, B.D., 2012. Introduction: Catching Up With Simondon. *SubStance*, 41(3), pp.3–15.

Healy, L., 2020. *Designing Unlikely Futures*. PhD thesis.

Hodkinson, S., 2019. *Safe as houses: Private greed, political negligence and housing policy after Grenfell*.

Holyoake, G.J., 1893. The Rochdale Pioneers. *Cooperative League of America*.

Homes for Lambeth, 2019. *Homes For Lambeth Business Plan*. [online] Available at: <http://estateregeneration.lambeth.gov.uk/business_plan_2019_20>.

Hui, Y., 2016. *On the existence of digital objects*. Electronic mediations. Minneapolis, Minn. London: University of Minnesota Press.

Hui, Y., 2018. On Automation and Free Time. [online] Available at: <https://www.e-flux.com/architecture/superhumanity/179224/on-automation-and-free-time/> [Accessed 5 Dec. 2021].

Hui, Y., 2020. *Art and cosmotechnics*. Minneapolis, MN: e-flux books.

Hunger, F., 2018. Epistemic harvest: The electronic database as discourse and means of data production. *APRJA*, 7(1).

Hutchins, E., 1995. *Cognition in the wild*. Nachdr. ed. Cambridge, Mass: MIT Press.

Hwaci, 2021. *Most Widely Deployed SQL Database Engine*. Available at: <https://www.sqlite.org/mostdeployed.html> [Accessed 17 Sep. 2021].

IBM, 1996. *History of SQL*. Available at: <https://docs.oracle.com/cd/B12037_01/server.101/b10759/intro001.htm> [Accessed 10 Apr. 2019].

IBM, 2003. *Edgar F. Codd*. Available at: <https://www-03.ibm.com/ibm/history/exhibits/builders/builders_codd.html> [Accessed 16 Jun. 2016].

Iliadis, A., 2013. A new individuation: Deleuze's Simondon Connection. Vol 4(No 1).

Imielinski, T. and Lipski, W., 1982. A systematic approach to relational database theory. In: *Proceedings of the 1982 ACM SIGMOD international conference on Management of data*, SIGMOD '82. New York, NY, USA: Association for Computing Machinery, pp.8–14.

Independent Tenant and Leaseholder Advisers Network, 2017. *Response to Homes for Londoners, draft good practice guide to estate regneration, Mayor of London*.

Introna, L.D., 2015. Algorithms, Governance, and Governmentality: On Governing Academic Writing. *Science, Technology, & Human Values*, 41(1), pp.17–49.

Jardine, D.A., 1977. *The ANSI/SPARC DBMS model: Proceedings of the second SHARE Working Conference on Data Base Management Systems, Montreal, Canada, April 26-30, 1976*. Amsterdam: North-Holland Pub. Co.

Jessel, E., 2018. Lambeth apologises for "damaging" works to Kate Macintosh's listed 60s block. *Architects Journal*. [online] Available at: <https://www.architectsjournal.co.uk/news/lambeth-apologises-for-damaging-works-to-kate-macintoshs-listed-60s-block/10035789.article> [Accessed 20 Feb. 2019].

Jucan, I.B. and Parikka, J. eds., 2018. *Remain*. In search of media. Minneapolis: University of Minnesota Press.

Jungnickel, K., 2018. Making Things to make Sense of Things. In: J. Sayers, ed., *The Routledge Companion to Media Studies and Digital Humanities*, First. New York: Routledge, Taylor & Francis Group: Routledge, pp.492–502.

Keene, T., 2015. *Housing database systems used - a Freedom of Information request to Lambeth Borough Council*. Available at: <https://www.whatdotheyknow.com/request/housing_database_systems_used> [Accessed 23 Oct. 2017].

Keene, T., 2018a. *Homes built*. *Google Docs*. Available at: <https://docs.google.com/spreadsheets/d/1IKLjIuS9GwlLaDfizLuVubKVLG3zOVtpTklIoLlL8kQ/edit?ouid=110400917464096304812&usp=sheets_home&ths=true&usp=embed_facebook> [Accessed 20 Sep. 2021].

Keene, T., 2018b. Inspire to resist. In: *Inspire 2 resist*. [online] pp.15–18. Available at: <http://concretesoldiers.uk/onewebmedia/HANDBOOK%20STORIES.pdf> [Accessed 16 Jan. 2020].

Keene, T., 2019. Demolition Machines: Making and thinking with databases of urban regeneration. In: L. Bogers and L. Chiappini, eds., *The critical makers reader: (Un)learning technology*.

Keene, T., 2021. The Shadow Database: Activism, Art, and Aspiration within Urban Regeneration. *Media-N| The Journal of the New Media Caucus*, 17(2), pp.112–126.

Keene, T. and Kyprianou, K., 2007. *Aristotles Office*. Available at: <http://theanthillsocial.co.uk/archive/aristotlesoffice> [Accessed 1 Feb. 2015].

Kelty, C.M., 2016. Too Much Democracy in All the Wrong Places: Toward a Grammar of Participation. *Current Anthropology*, 58(S15), pp.S77–S90.

Kern, L. and McLean, H., 2017. Undecidability and the Urban: Feminist Pathways Through Urban Political Economy. *ACME: An International Journal for Critical Geographies*, 16(3), pp.405–26.

Kitchin, R., 2014. *The Data Revolution: Big Data, Open Data, Data Infrastructures and Their Consequences*. SAGE.

Kitchin, R., 2017. Thinking critically about and researching algorithms. *Information, Communication & Society*, 20(1), pp.14–29.

Kitchin, R. and Dodge, M., 2011. *Code/space: Software and everyday life*. Software studies. Cambridge, Mass: MIT Press.

Kitchin, R. and Fraser, A., 2020. *Slow computing: Why we need balanced digital lives*. Bristol: Bristol University Press.

Kittler, F.A., 1995. There is No Software.

Kittler, F.A., 1999. *Gramophone, film, typewriter*. Writing science. Stanford, Calif: Stanford University Press.

Knipfer, D., 2005. *Relative Dimensioning - The Power to Improve your Accuracy*. Available at: <http://www.woodworkstuff.net/DKRelDim.html> [Accessed 21 Dec. 2021].

Kowalski, R., 1979. Algorithm = logic+ control. *Communications of the ACM*, 22(7), pp.424–436.

KPMG, 2016. *External Audit Report 2015/16, London Borough of Lambeth*.

Krajewski, M., 2011. *Paper machines: About cards & catalogs, 1548-1929*. History and foundations of information science. Cambridge, Mass: MIT Press.

Lambeth Borough Council, 2012. *Decision - Customer Service and Planned Maintenance Modules - Northgate Housing | Lambeth Council*. Available at: <http://moderngov.lambeth.gov.uk/ieDecisionDetails.aspx?ID=2799> [Accessed 24 Mar. 2016].

Lambeth Borough Council, 2012. *Lambeth Estate Regeneration Programme: Strategic Delivery Approach*. [online] Available at: <https://moderngov.lambeth.gov.uk/ieDecisionDetails.aspx?AIId=18725> [Accessed 5 Jan. 2016].

Lambeth Borough Council, 2012. *Lambeth Housing Standard*. [online] Available at: <https://moderngov.lambeth.gov.uk/documents/s40594/06%20Lambeth%20Housing%20Standard.pdf> [Accessed 25 Nov. 2016].

Lambeth Borough Council, 2012. *Officer Delegated Decision Report: Provision of a new Housing Asset Management Database*. Available at: <https://moderngov.lambeth.gov.uk/documents/s61140/Housing%20Asset%20Management%20Database%20ODDR.pdf> [Accessed 1 Nov. 2016].

Lambeth Borough Council, 2012. *Tenants asked "work with us to transform your estates"*.

Lambeth news. Available at: <https://lambethnews.wordpress.com/2012/10/22/tenants-asked-work-with-us-to-transform-your-estates/> [Accessed 12 Jan. 2018].

Lambeth Borough Council, 2013. *Cressingham Gardens: Lambeth Housing Standard cost assumptions*. Available at: <https://www.whatdotheyknow.com/request/151748/response/386256/attach/html/6/Cressingham%20Gardens%20LHS%20explanation.pdf.html> [Accessed 1 Nov. 2016].

Lambeth Borough Council, 2014. *Consultation Information Pack (supplied to Cressingham residents)*.

Lambeth Borough Council, 2014. *Part 1 – Introduction to the Cooperative Council Constitution*. Available at: <https://www.lambeth.gov.uk/sites/default/files/ec-Part%201-Introduction-to-the-Cooperative-Council-Constitution.pdf> [Accessed 12 Apr. 2017].

Lambeth Borough Council, 2015. *Disrepair Litigation Update: Tenants' Council agenda, prepared by Cedric Boston Director of Housing Services.*

Lambeth Borough Council, 2015. *Lambeth Local Plan*. Available at: <https://www.lambeth.gov.uk/sites/default/files/pl-lambeth-local-plan-2015-web.pdf> [Accessed 5 Dec. 2016].

Lambeth Borough Council, 2016a. *Appendix B - Cressingham Gardens - Options Analysis*. Available at: <https://moderngov.lambeth.gov.uk/documents/s80078/Appendix%20B%20-%20Cressingham%20Gardens%20-%20Options%20Analysis.pdf> [Accessed 24 Oct. 2017].

Lambeth Borough Council, 2016. *Improving the Key Guarantees. Lambeth Council Estate Regeneration*. Available at: <http://estateregeneration.lambeth.gov.uk/kg_consultation> [Accessed 30 Nov. 2016].

Lambeth Borough Council, 2016b. *Overview and Scrutiny Committee: Investing in Better Neighbourhoods and Building the Homes we Need to House the People of Lambeth - Cressingham Gardens Estate: Response to call in (Report Authorised by: Sue Foster - Strategic Director, Neighbourhoods and Growth).*

Lambeth Borough Council, 2016c. *Planned maintance contracts - a Freedom of Information request to Lambeth Borough Council*. *WhatDoTheyKnow*. Available at: <https://www.whatdotheyknow.com/request/planned_maintance_contracts> [Accessed 21 Oct. 2020].

Lambeth Borough Council, 2017a. *Response to the 'People's Audit'. Love Lambeth*. Available at: <https://love.lambeth.gov.uk/peoples-audit-response/> [Accessed 8 Sep. 2021].

Lambeth Borough Council, 2017b. *The Key Guarantees. Lambeth Council Estate Regeneration*. Available at: <http://estateregeneration.lambeth.gov.uk/key_guarantees> [Accessed 7 May 2019].

Lambeth Borough Council, 2018. *More and better homes*. *Google My Maps*. Available at:

<https://www.google.com/maps/d/viewer?mid=1TRRMtGOZHpYn-GnyeIBEEMxmqaoWfaRE> [Accessed 20 Sep. 2021].

Lambeth Borough Council, 2020. *Planning application reference: 20/02406/RG3*. Available at: <https://planning.lambeth.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=QDRW4MBOGMR00> [Accessed 7 Nov. 2021].

Lambeth Labour Party, 2014. *Lambeth Labour Manifesto 2014*. Available at: <http://d3n8a8pro7vhmx.cloudfront.net/labourclp132/pages/59/attachments/original/1397750146/LambethLabourManifesto.pdf> [Accessed 2 Oct. 2015].

Lambeth Living, 2012. *Lambeth Living Draft Business Plan 2012/13 – 2016/17*.

Latour, B., 1991. The Berlin Key or How to Do things with Words.

Latour, B., 1996. On actor-network theory. A few clarifications plus more than a few complications. *Soziale welt*, 47(4), pp.369–381.

Latour, B., 2004. ANT for studying information systems. In: *The Social Study of Information and Communication Technology: Innovation, Actors and Contexts, , Edited by Chrisanthi Avgerou, Claudio U. Ciborra, and Frank Land*. 62–76.

Latour, B., 2013. *An inquiry into modes of existence: An anthropology of the moderns*. Cambridge, Massachusetts: Harvard University Press.

Law, J., 2004. *After method: Mess in social science research*. London; New York: Routledge.

Lees, L., Slater, T. and Wyly, E.K., 2010. *The Gentrification Reader*. Routledge.

Lemke, T., 2001. 'The birth of bio-politics': Michel Foucault's lecture at the Collège de France on neo-liberal governmentality. *Economy and Society*, 30(2), pp.190–207.

Leonardi, P.M., 2010. View of Digital materiality? How artifacts without matter, matter | First Monday. *First Monday*.

Lessig, L., 2004. *Free Culture*. Lulu Press, Inc.

Lichterman, P., 1998. What Do Movements Mean? The Value of Participant-Observation. *Qualitative Sociology*, 21(4), pp.401–418.

Lindberg, S., 2019. Being with Technique–Technique as being-with: The technological communities of Gilbert Simondon. *Continental Philosophy Review*, 52(3), pp.299–310.

Lloyd, S., 2018. *Approved Assessor Service: Continuous Assessment (final) Report. Prepared for UK Gov to assess the competence of the Cressingham Gardens Resident Management Organisation*

(CGRMO) for the RTM.

Lloyd, T., 2010. *Mears set for £170m Lambeth deal*. *Inside Housing*. Available at: <https://www.insidehousing.co.uk/news/news/mears-set-for-170m-lambeth-deal-19326> [Accessed 17 Jun. 2021].

London Assembly, 2015. *Knock It Down Or Do It Up: The challenge of estate regeneration*. Available at: <https://www.london.gov.uk/sites/default/files/gla_migrate_files_destination/KnockItDownOrDoItUp_0.pdf> [Accessed 7 Jan. 2016].

London Tenants Federation, Lees, L., Just Space and Southwark Notes Archive Group, 2014. *Staying Put*.

Lotti, L., 2015. Making sense of power: Repurposing Gilbert Simondon's philosophy of individuation for a mechanist approach to capitalism (by way of François Laruelle). *Platform: Journal of Media and Communication*.

Lucchese, F.D., 2009. *Monstrous Individuations: Deleuze, Simondon, and Relational Ontology*.

Lüders, C., 2004. Field Observation and Ethnography. In: U. Flick, E. von Kardoff and I. Steinke, eds., *A Companion to Qualitative Research*. London: Sage, pp.222–230.

Lykke, N., 2010. *Feminist studies: A guide to intersectional theory, methodology and writing*. Routledge advances in feminist studies and intersectionality. New York: Routledge.

Lyon, D. ed., 2003. *Surveillance as social sorting: Privacy, risk, and digital discrimination*. London ; New York: Routledge.

Mackenzie, A., 2002. *Transductions: Bodies and machines at speed*. London ; New York: Continuum.

Mackenzie, A., 2010. *Wirelessness: Radical Empiricism in Network Cultures*. Cambridge, Mass: MIT Press.

Mairet, C.E., 1977. Data Administration: Managing an important resource. In: *The ANSI/SPARC DBMS model: Proceedings of the second SHARE Working Conference on Data Base Management Systems, Montreal, Canada, April 26-30, 1976*. Amsterdam: North-Holland Pub. Co., pp.1–22.

Malthouse MP, K., 2019. *Cressingham Gardens determination letter*.

Mansoux, A., 2017. Sandbox Culture: A Study of the Application of Free and Open Source Software Licensing Ideas to Art and Cultural Production. p.524.

Marino, M.C., 2020. *Critical code studies: Initial methods*. Software studies. Cambridge, Massachusetts: The MIT Press.

Marres, N., Guggenheim, M. and Wilkie, A., 2018. *Inventing the Social*. Mattering Press.

Marrs, C., 2018. *Khan hits back at claim he rushed regeneration schemes to avoid ballots. Architects Journal*. Available at: <https://www.architectsjournal.co.uk/news/khan-hits-back-at-claim-he-rushed-regeneration-schemes-to-avoid-ballots/10029549.article> [Accessed 2 Oct. 2018].

Marvin, C., 1990. *When old technologies were new: Thinking about electric communication in the late nineteenth century*. 1. issued as an Oxford Univ. Press paperback, 9. print ed. New York, NY: Oxford Univ. Press.

Marx, K., 1993. The Fragment on Machines. In: *Grundrisse, Foundations of the Critique of Political Economy by Karl Marx*. pp.690–712.

Masters, J., 1995. The History of Action Research. In: *Action Research Electronic Reader*, Hughes (ed). The University of Sydney.

Mattern, S., 2015. *Deep mapping the media city*. Forerunners. Minneapolis, [Minnesota]: University of Minnesota press.

Mattern, S., 2017. *Code + clay... Data + dirt: Five thousand years of urban media*. Minneapolis ; London: University of Minnesota Press.

Mattern, S., 2021. *A city is not a computer: Other urban intelligences*. 1st ed. Places books. Princeton: Princeton University Press.

McKenzie, L., 2013. The Stigmatised and De-valued Working Class: The State of a Council Estate. *Class Inequality in Austerity Britain*, pp.128–144.

McKenzie, L., 2015. *Getting by: Estates, class and culture in austerity Britain*. Bristol Chicago: Policy Press.

McKenzie, L., 2021. *'It's only 11am and everyone is crying': working-class diaries of lockdown. LSE COVID-19*. Available at: <https://blogs.lse.ac.uk/covid19/2021/04/19/its-only-11am-and-everyone-is-crying-working-class-diaries-of-lockdown/> [Accessed 12 Nov. 2021].

McKinlay, A. and Starkey, K. eds., 1998. *Foucault, management and organization theory: From panopticon to technologies of self*. London ; Thousand Oaks, Calif: Sage Publications.

McLuhan, M., 1994. *Understanding media: The extensions of man*. 1st MIT Press ed ed. Cambridge, Mass: MIT Press.

McQuillan, D., Forthcoming 2022. *Resisting AI: An Anti-fascist Approach to Artificial Intelligence*.

Medosch, A., 2016. Shockwaves in the New World Order of Information and Communication. In: C. Paul, ed., *A Companion to Digital Art*. Hoboken, NJ: John Wiley & Sons, Inc, pp.353–383.

Michael, M., 2016. *Actor network theory: Trials, trails and translations*. 1st edition ed. Thousand Oaks, CA: SAGE Ltd.

Mills, A., 2010. *Performativity*. 2455 Teller Road, Thousand Oaks California 91320 United States: SAGE Publications, Inc.

Mills, S., 2003. *Michel Foucault*. Routledge critical thinkers. London ; New York: Routledge.

Minton, A., 2017. *Big Capital: Who Is London For?* UK: Penguin.

Minton, A., Pace, M. and Williams, H., 2016. The housing crisis: A visual essay. *City*, 20(2), pp.256–270.

Mitchell, R., 2012. Gilbert Simondon: Milieus, Techniques, Aesthetics, Introduction to Inflexions Issue 5. *Inflexions*, (5).

Mol, A., 2002. *The Body Multiple: Ontology in Medical Practice*. Duke University Press.

Morgan, H.L., 1977. Above the conceptual level: Social and organisational views of database managment systems. In: D.A. Jardine, ed., *The ANSI/SPARC DBMS model: Proceedings of the second SHARE Working Conference on Data Base Management Systems, Montreal, Canada, April 26-30, 1976*. Amsterdam: North-Holland Pub. Co., pp.155–179.

Mumford, E., 1987. The collective resource approach to systems design. In: *G. Bjerknes, P. Ehn, & M. Sociotechnical systems design: Evolving theory and practice*. Brookfield, pp.59–76.

Munster, A., 2013. *An Aesthesia of Networks: Conjunctive Experience in Art and Technology*.

Nabben, K., Puspasari, N., Kelleher, M. and Sanjay, S., 2021. *Grounding decentralised technologies in cooperative principles: What can "Decentralised Autonomous Organisations" (DAOs) and platform cooperatives learn from each other?*

Nadim, T., 2012. *Inside the sequence universe: The amazing life of data and the people who look after them*. PhD thesis.

Neumann, J., 2005. Kurt lewin at the tavistock institute. *Educational Action Research*, 13, pp.119–136.

O'Kelly, S., 2020. *Shared ownership: A misnomer that can be worse than renting and worse than leasehold, says solicitor*. *Leasehold Knowledge Partnership*. Available at: <https://www.leaseholdknowledge.com/shared-ownership-a-misnomer-that-can-be-worse-than-renting-and-worse-than-leasehold-says-solicitor/> [Accessed 28 Sep. 2021].

Oliver, J., 2017. *HARVEST*. Available at: <https://julianoliver.com/output/harvest> [Accessed 31 Jan. 2020].

Oracle, 2007. *History of The Oracle Database*. Available at: <http://www.oracle.com/us/corporate/profit/p27anniv-timeline-151918.pdf> [Accessed 16 Jun. 2016].

Paramo, R., 2016. *ERP Systems - a Freedom of Information request to Lambeth Borough Council*. *WhatDoTheyKnow*. Available at: <https://www.whatdotheyknow.com/request/erp_systems_174> [Accessed 16 Feb. 2018].

Parikka, J., 2012. *What is media archaeology?* Cambridge, UK ; Malden, MA: Polity Press.

Park, R.E., Burgess, E.W., McKenzie, R.D. and Wirth, L., 1925. *The city*. Chicago, Ill.: The University of Chicago Press.

Patel, J., 2016. *Relational Database Management Systems*. Osmora Incorporated.

Penn, S., 2019. Learning the washing machine. In: *The Critical Makers Reader: (Un)learning Technology*. Institute of Network Cultures, pp.148–161.

Pennington, S., Forthcoming 2022. *Taking Care of Issues of Concern: Towards a care sensibility in design*. PhD thesis.

Penny, J., 2017. Between coercion and consent: The politics of "Cooperative Governance" at a time of "Austerity Localism" in London. *Urban Geography*, 38(9), pp.1352–1373.

Penny, J., 2021. Revenue Generating Machines? London's Local Housing Companies and the Emergence of Local State Rentierism. *Antipode*.

Petzold, C., 2000. *Code: The hidden language of computer hardware and software*. Paperback ed ed. Redmond, Wash: Microsoft Press.

Plant v London Borough of Lambeth, 2016. *Mr Justice Holgate*.

Plummer-Fernandez, M., 2019. *The art of bots: A practice-based study of the multiplicity, entanglements and figuration of sociocomputational assemblages*. PhD thesis. Goldsmiths, University of London.

Press Association, 2017. British Airways IT failure caused by 'uncontrolled return of power'. *The Guardian*. [online] Available at: <http://www.theguardian.com/business/2017/may/31/ba-it-shutdown-caused-by-uncontrolled-return-of-power-after-outage> [Accessed 2 Aug. 2017].

Pritchard, S., 2017. *Artwashing: Social Capital & Anti-Gentrification Activism*. *COLOURING IN CULTURE*. Available at: <http://colouringinculture.org/blog/artwashingsocialcapitalantigentrification> [Accessed 30 Jan. 2020].

Radical Housing Network, 2013. *Southwark: Social Cleansing and the Right to Return*. Available

at: <https://radicalhousingnetwork.org/southwark-social-cleansing-and-the-right-to-return/> [Accessed 9 Apr. 2019].

Räsänen, M. and Nyce, J.M., 2013. The Raw is Cooked: Data in Intelligence Practice. *Science, Technology, & Human Values*, 38(5), pp.655–677.

Raymond, E., 2001. *The Cathedral & the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary*. "O'Reilly Media, Inc.".

Read, J., 2005. The Production of Subjectivity: From Transindividuality To The Commons. *New Formations*, 70(70), pp.113–131.

Redström, J., 2008. RE:Definitions of use. *Design Studies*, 29(4), pp.410–423.

Reed, S., 2001. *Lambeth launches the cooperative council. Progress | Centre-left Labour politics.* Available at: <http://www.progressonline.org.uk/2011/01/28/lambeth-launches-the-cooperative-council/> [Accessed 26 Apr. 2019].

Regine, 2021. *GoldenNFT. Freedom of Movement is a Capitalist Right. We Make Money Not Art.* Available at: <https://we-make-money-not-art.com/goldennft-freedom-of-movement-is-a-capitalist-right/> [Accessed 17 Nov. 2021].

Reider, B., 2011. *A fragment of simondon.* Available at: <http://thepoliticsofsystems.net/2011/07/a-fragment-of-simondon/> [Accessed 22 Jan. 2020].

Rose, N., O'Malley, P. and Valverde, M., 2006. Governmentality. *Annual Review of Law and Social Science*, 2(1), pp.83–104.

Ryan, T.R., 2021. *Will the Artworld's NFT Wars End in Utopia or Dystopia?* Available at: <https://artreview.com/will-the-artworld-nft-wars-end-in-utopia-or-dystopia/> [Accessed 4 Dec. 2021].

Savage, M., 2021. *The return of inequality: Social change and the weight of the past*. Cambridge, Massachusetts: Harvard University Press.

Schinkel, W., 2007. Sociological Discourse of the Relational: The Cases of Bourdieu & Latour. *The Sociological Review*, 55(4), pp.707–729.

Sendra, P. and Fitzpatrick, D., 2020. *Community-Led Regeneration*. UCL Press.

Share Lab, 2016. *Immaterial Labour and Data Harvesting.* Available at: <https://labs.rs/en/facebook-algorithmic-factory-immaterial-labour-and-data-harvesting/> [Accessed 2 Aug. 2019].

Sheldon, M., 2015. *Urban Art and Uneven Development: The Geography of "Artwashing" in Miami and Philadelphia*. PhD thesis. University of Miami.

Shepard, M. ed., 2011. *Sentient city: Ubiquitous computing, architecture, and the future of urban space*. New York City : Cambridge, MA: Architectural League of New York ; MIT Press.

Shklovsky, V., 1917. *Art as Technique*.

Simondon, G., 1954. *L'invention et le développement des techniques*. Albin Michel.

Simondon, G., 1958. *Du mode d' existence des objets techniques*.

Simondon, G., 1980. *On the mode of existence of technical objects*. Translated by N. Mellamphy.

Simondon, G., 2016. *On the mode of existence of technical objects*. Translated by C. Malaspina. and Translated by J. Rogove. Minneapolis, MN: Univocal Pub.

Simondon, G., 2020. *Individuation in light of notions of form and information*. Posthumanities. Translated by T. Adkins. Minneapolis: University of Minnesota Press.

Sng, P., 2017. *Dispossession: The great social housing swindle*.

Social Life, 2014. *Living on Cressingham*.

Stallman, R., 2002. *Free Software, Free Society: Selected Essays of Richard M. Stallman*.

Stallman, R., 2020. *Why Open Source misses the point of Free Software*. Available at: <https://www.gnu.org/philosophy/open-source-misses-the-point.en.html> [Accessed 27 May 2020].

Standage, T., 1998. *The Victorian Internet: The remarkable story of the telegraph and the nineteenth century's online pioneers*. 3. impression ed. A Phoenix paperback. London: Phoenix.

Star, S.L., 1995. *The Cultures of Computing*. Wiley.

Stengers, I., 2004. Résister À Simondon? *Multitudes*, 4(4), pp.55–62.

Sweeny, R.W., 2015. *Decentralization and Dysfunction in New Media Art Education*. Bristol; Chicago: Intellect.

Tall Consulting Structural Engineers, 2013. *Cressingham Gardens Estate Structural Report*. Available at: <https://www.whatdotheyknow.com/request/219718/response/686941/attach/3/Cressingham%20Gardens.pdf> [Accessed 25 Feb. 2017].

Terranova, T., 2006. The Concept of Information. *Theory, Culture & Society*, 23(2-3), pp.286–288.

The Land, 2015. Dragons' Den. *The Land*, (Summer 2015).

The Peoples Audit, 2017. *The Peoples Audit 2015/16*. Available at: <http://www.thepeoplesaudit.info/report.pdf> [Accessed 25 Sep. 2017].

The Twentieth Century Society, 2015. *Building of the month: Cressingham Gardens Estate*. Available at: <https://c20society.org.uk/building-of-the-month/cressingham-gardens-estate-lambeth> [Accessed 16 Jul. 2021].

Thompson, K. and Ritchie, D.M., 1971. *Unix Manual, first edition*.

Trist, E.L. and Bamforth, K.W., 1951. Some Social and Psychological Consequences of the Longwall Method of Coal-Getting: An Examination of the Psychological Situation and Defences of a Work Group in Relation to the Social Structure and Technological Content of the Work System. *Human Relations*, 4(1), pp.3–38.

Tsing, A.L., 2015. *The mushroom at the end of the world: On the possibility of life in capitalist ruins*. Princeton University Press.

Tufte, E.R., 1983. *The Visual Display of Quantitative Information*. Graphics Press.

UK Gov, 2006. *A decent home: Definition and guidance - GOV.UK*. [online] Available at: <https://www.gov.uk/government/publications/a-decent-home-definition-and-guidance> [Accessed 29 Nov. 2017].

UK Gov, 2017. *50 years of the English Housing Survey.* [online] Available at: <https://nls.ldls.org.uk/welcome.html?ark:/81055/vdc_100066544760.0x000001> [Accessed 7 Oct. 2021].

UK Gov, 2021. *Algorithmic Transparency Standard*. *GOV.UK*. Available at: <https://www.gov.uk/government/collections/algorithmic-transparency-standard> [Accessed 3 Dec. 2021].

Uldam, J. and McCurdy, P., 2013. Studying Social Movements: Challenges and Opportunities for Participant Observation: Challenges and Opportunities for Participant Observation. *Sociology Compass*, 7(11), pp.941–951.

Verdegem, P. ed., 2021. *AI for Everyone? Critical Perspectives*. University of Westminster Press.

Wallace, A., 2017. The Inbetweeners: Living with Abandonment, Gentrification and Endless Urban "Renewal" in Salford, UK. In: P. Watt and P. Smets, eds., *Social housing and urban renewal: A cross-national perspective*, First edition. Bingley, UK: Emerald Publishing, pp.431–457.

Watson, C., 2020. Active Citizenship and Local Governance in the Case of Cressingham Gardens: Agonism or Antagonism? *Housing, Theory and Society*, pp.1–20.

Watt, P., 2009. Housing Stock Transfers, Regeneration and State-Led Gentrification in London. *Urban Policy and Research*, 27(3), pp.229–242.

Watt, P., 2016. A nomadic war machine in the metropolis. *City*, 20(2), pp.297–320.

Watt, P., 2018. ’Social Housing Not Social Cleansing’ Contemporay Housing Struggles in London. In: *Rent And Its Discontents*.

Watt, P., 2019. *Estate Regeneration and its Discontents: Public Housing, Place and Inequality in London*.

Watt, P. and Minton, A., 2016. London’s housing crisis and its activisms. *City*, 20(2), pp.204–221.

Watt, P. and Smets, P. eds., 2017. *Social housing and urban renewal: A cross-national perspective: Edited by Paul Watt and Peer Smets*.

Webb, B., 1926. *My Apprenticeship*. London: Longmans, Green and Co.

What Do They Know, 2012. *Estate Regeneration Strategy analysis - a Freedom of Information request to Lambeth Borough Council*. *WhatDoTheyKnow*. Available at: <https://www.whatdotheyknow.com/request/estate_regeneration_strategy_ana> [Accessed 24 Sep. 2017].

What Do They Know, 2015. *Income and repairs information for all Lambeth Housing Estates - a Freedom of Information request to Lambeth Borough Council*. *WhatDoTheyKnow*. Available at: <https://www.whatdotheyknow.com/request/income_and_repairs_information_f> [Accessed 31 Aug. 2021].

What Do They Know, 2017. *Income and repairs expenditure for Grenfell tower - a Freedom of Information request to Royal Borough of Kensington and Chelsea*. *WhatDoTheyKnow*. Available at: <https://www.whatdotheyknow.com/request/income_and_repairs_expenditure_f> [Accessed 18 Oct. 2021].

What Do They Know, 2018. *Number of council homes built.* Available at: <https://www.whatdotheyknow.com/request/474749/response/1152316/attach/html/2/Response.pdf.html> [Accessed 20 Sep. 2021].

What Do They Know, 2021. *Homes for Lambeth- Total Costs of All Four HfL Companies - a Freedom of Information request to Lambeth Borough Council*. *WhatDoTheyKnow*. Available at: <https://www.whatdotheyknow.com/request/homes_for_lambeth_total_costs_of> [Accessed 4 Oct. 2021].

Wilkie, A., 2010. *User assemblages in design: An ethnographic study*. PhD thesis. Goldsmiths, University of London.

Wright, J.D., 2015. *International encyclopedia of the social & behavioral sciences*.

YoHa, 2013. *Evil Media Distribution Centre | YoHa*. Available at: <http://yoha.co.uk/node/716> [Accessed 24 Jan. 2020].

YoHa, 2019. *Contraption | YoHa*. Available at: <http://yoha.co.uk/coalcontraptions> [Accessed 31 Jul. 2019].

Yormark, B., 1977. The ANSI/X3/SPARC/SGDBMS Architecture. In: *The ANSI/SPARC DBMS model: Proceedings of the second SHARE Working Conference on Data Base Management Systems, Montreal, Canada, April 26-30, 1976*. Amsterdam: North-Holland Pub. Co., pp.1–22.

Zangl, V. and Bala, S. eds., 2015. *Humour in Art and Activism*. The European Journal of Humour Research.