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A-LEVEL

A-LEVEL GEOGRAPHY
(7037)

EXAMPLE NEA INVESTIGATION

Marked NEA investigation with commentary and completed marksheet

An example NEA portfolio with completed marksheet and examiner commentary

"The environmental and social impacts of the South Devon link road"

Version 1.0 Spring 2020

Moderator mark sheet

Candidate number | **Candidate's full name**

Click here to enter text.

Title of investigation: The environmental and social impacts of the South Devon Link Road

To be completed by the moderator

NEA proposal. Completed with teacher approval — Yes

Incomplete

Marks must be awarded in accordance with the instructions and criteria in the specification.

Area	Level	Overall level	Mark	Comment
Area 1. Introduction and preliminary research 10 marks (a) To define the research questions which underpin field investigations (AO3)	4	4	10	1a. Aims and sub-hypotheses are stated on p5, closely connected to the title, and with evaluative focus (extent of environmental impact). The links to the specification are explicitly identified on p6, with references made to changing places, and two aspects of CUE; a brief rationale for the links is provided. The investigation adheres to the plan on the CRF 1b.Comprehensive, balanced and relevant literature review, fully referenced in footnotes eg p7,8,9,10 (and bibliography p38). Theoretical context is well understood and fully stated. Diagram on p7 summarises aspects of Q of L to be considered. Detailed rationale for each sub-hypothesis p 7-9. Thorough research of the background to the link road, with specific focus on the aims of the study as well as wider relevant geographical background (on quality of life and air pollution). Locational/comparative context shown on p4 ,5 and in subsequent descriptions
(b) To research relevant literature sources and understand and write up the theoretical or comparative context for a research question (AO3)	4			
Area 2. Methods of field investigation 15 marks (a) To observe and record phenomena in the field and devise and justify practical approaches taken in the field including frequency/timing of	4	4	15	2a. Appropriate range of methods adopted and justified. Primary data collection comprised use of sound meter to register noise pollution with supplementary

observation, sampling, and data collection approaches (AO3)				GMAL calculation to measure accessibility, and online questionnaire sent via local community facebook pages. Secondary data consisted of estate agent house price information. Photograph headlines and photographic support used where relevant. Justification for each method is thorough and linked to each sub-hypothesis. Sampling strategy for noise survey stated-random sampling approach using grid and number table to generate fieldwork sites. Other sampling strategies inferred or stated eg opportunistic sampling for questionnaires, randomly generated grids for house price data. Size of sample is indicated for most surveys-eg 10 locations with 5 measurements of noise level. Dates and times stated. Detailed use of approaches. Thorough justification (generally) Level 4 2b. Thorough demonstration of K and U relevant to the investigation. Methods are explained fully, in a step by step approach, showing practical knowledge of field methodologies. Level 4 2c. All techniques are followed up and implemented. Data is of good quality and relevant to the investigation. Sample size is suitable to the scope of the investigation, eg 129 responses to the online questionnaire. Level 4
(b) To demonstrate practical knowledge and understanding of field methodologies appropriate to the investigation of human and physical processes (AO3)	4			
(c) To implement chosen methodologies to collect data/information of good quality and relevant to the topic under investigation (AO3)	4			
Area 3. Methods of critical analysis **20 marks** (a) To demonstrate knowledge and understanding of the techniques appropriate for analysing field data and information and for representing results, and show ability to select suitable quantitative or qualitative approaches and to apply them (AO3)	4	4	20	3a. A range of qualitative and quantitative techniques is used to present and analyse the data, including labelled photographs, facebook screenshot, located circles shaded to show GMAL scores p17, bar graphs, pie charts, scatter graphs p23-24, located proportional circles to show noise levels p26 and 30, with some raw and processed data in appendix. ARC/GIS is used effectively to show spatial patterns. Some maps lack conventions. Further
(b) To demonstrate the ability to interrogate and critically examine field data in order to comment on its accuracy and/or the extent to which it is representative, and use the experience to extend geographical understanding (AO3)	4+			

(c) To apply existing knowledge, theory and concepts to order and understand field observations (AO2)	4			statistical analysis including Spearman rank test, some with test of significance eg p26. Thorough ability to select suitable methods for analysis and presentation. Level 4 3b.Results are fully interrogated. Each set of results is considered and links made between data sets. Data is thoroughly manipulated and reasons given. Detailed explanations of findings, with anomalies explained. Interpretations closely linked to sub hypotheses. Some recognition of limitations of sample size eg p 34 and its impacts on the reliability of the investigation. Level 4 3c. Links are made with theoretical context throughout, eg p23, p26 with further references to literature eg p26, 27. Analysis is interwoven into broader geographical context. Clear links back to spec content as reflection of improved understanding of social and environmental impacts p33-34. Effective application Level 4

Candidate number Click here to enter.

Candidate's full name Click here to enter text.

Area	Level	Overall level	Mark	Comment
Area 4. Conclusions, evaluation and presentation 15 marks (a) To show the ability to write up field results clearly and logically, using a range of presentation methods. (AO3)	4+	4	15	4a. A well structured investigation, showing strong links from hypothesis through to conclusions. Presentation was effective and embedded within the text, with little superfluous information. The report covers all aspects of the enquiry route. Wide range of presentation methods, effectively embedded in the report. Level 4. 4b. Each method is systematically evaluated, and there is some reflection on the success of the whole investigation. Recognises constraints and limitations of the investigation. Suggestions for improvement to specific methods and further research are explicitly stated p34-35. Limited comment on validity of conclusions. Ethical dimension is considered separately, and is also inferred in discussions of methodology and interpretation. Methods evaluated in methodology. 4c. Clear connections made with initial research question and sub-hyptheses. Detailed conclusions for each sub statement followed by overall conclusion in summary form. Conclusions strongly supported by evidence. Makes a well-argued case. Thorough and coherent conclusions drawn, relating results to wider context.
(b) To evaluate and reflect on fieldwork investigations, explain how the results relate to the wider context and show an understanding of the ethical dimensions of field research. (AO3)	4			
(c) To demonstrate the ability to write a coherent analysis of fieldwork findings in order to answer a specific geographical question and to do this drawing effectively on evidence and theory to make a well-argued case. (AO3)	4+			
	Total (60 marks)		60	

Details of additional assistance given

Record here details of any assistance given to this candidate which is beyond that given to the class as a whole and beyond that described in the specification (*continue on a separate sheet if necessary*).

Click here to enter text.

Concluding comments

Click here to enter text.

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Example NEA portfolio

To be completed by the candidate

Investigation title: The environmental and social impacts of the South Devon Link Road

How the title links to the specification content:

3.2.3.7 Other contemporary urban environmental issues Environmental problems in contrasting urban areas: atmospheric pollution, water pollution and dereliction. The investigation will assess how the construction of the road has potentially created or alleviated environmental issues in contrasting urban areas. 3.2.3.8 Sustainable urban development Impact of urban areas on local and global environments. Dimensions of sustainability: natural, physical, social and economic. Concept of liveability. The investigation will analyse the impact of the South Devon Link Road on social factors in Buckland and Milber and Kerswell-With-Combe, specifically the concept of liveability. 3.2.2.1 The nature and importance of places. The concept of place and the importance of place in human life and experience. Insider and outsider perspectives on place.Categories of place: near places and far places experienced places and media places. Factors contributing to the character of places: Endogenous: location, topography, physical geography, land use, built environment and infrastructure, demographic and economic characteristics. Exogenous: relationships with other places.

Planned investigation hypothesis or question/sub-questions

1. The South Devon Link Road has had more of a negative impact on the environment in Buckland and Milber than in Kerswell-With-Combe. 2. The South Devon Link Road has had more of a negative impact on the quality of life in Buckland and Milber than it has on Kerswell-With-Combe.

Investigation focus – indication of how the enquiry will enable the candidate to address the investigation title and explore the theme in relation to the chosen geographical area

The enquiry title will be addressed through the collection of noise levels and public transport accessibility level data in two local wards to determine the extent of the environmental and social impact of the South Devon Link Road (SDLR).

Planned methodology – indication of qualitative and/or quantitative techniques including primary and, if relevant, secondary data collection techniques. Indication of the planned sampling strategy or strategies

The investigation will use random sampling methods to select random areas throughout both of the wards in question. The selected areas will have noise pollution data and public transport accessibility level data collected. The accessibility levels will be determined through the use of the Greater Manchester Accessibility Level (GMAL) calculation which is used in local government to determine the availability of transport networks to individual communities. The collection of noise pollution data will be collected using a sound meter. Furthermore, qualitative techniques will be employed, through the use of a social media survey. Additionally, secondary data, in the form of house prices, will be used in conjunction with noise pollution and GMAL data to support or question any patterns discovered.

Data collection: ☒ Individual ☐ Group

To be completed by the teacher

Teacher approval for the investigation or details of any necessary amendments that need to be made before approval can be given

An interesting and topical investigation given the controversial nature of the link road and the 50 year campaign to get it built. There is a clear need to consider health and safety with an investigation of this type but I like the varied range of orimary data collection you have planned.

☒ Approved ☐ Approved subject to the implementation of amendments above ☐ Resubmission required

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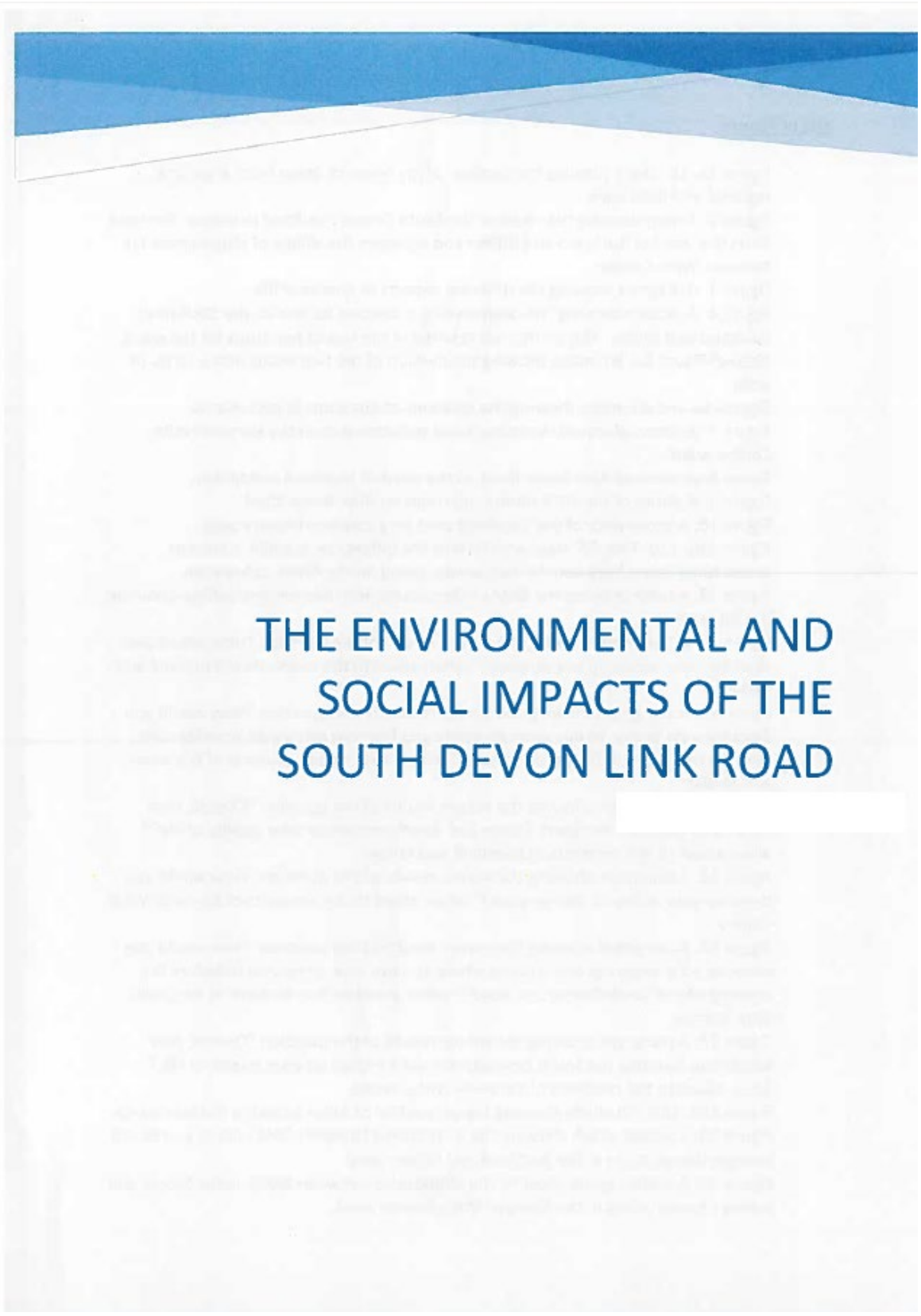

THE ENVIRONMENTAL AND SOCIAL IMPACTS OF THE SOUTH DEVON LINK ROAD

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List of Figures

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Abstract

The South Devon Link Road (SDLR) is a publicly funded infrastructure project that connects Newton Abbot and Torbay by bypassing the village of Kingskerswell. The £110m road, that opened in December 2015, was designed to alleviate persistent traffic issues along the pre-existing A380 route which passed through the village of Kingskerswell, in the ward of Kerswell-With-Combe[1]. Here, traffic issues became particularly notorious, with 35,000 vehicles passing through daily which led to the road becoming one of the most heavily used roads in the South West[2]. However, approval for the proposed plans proved to be especially difficult to achieve. Persistent local opposition to the road meant the government only gave its full support in May 2012 after 50 years of campaigning. Opposition to the controversial plan was particularly high among residents living in the immediate vicinity of the proposed road, with 63% of residents voting against construction of the new road in the ward of Buckland and Milber[3]. This display of NIMBYism is largely due to the perceived wide-ranging negative effects of the new road on social and environmental factors in the local area. Despite this, the completion of the road has also created many advantages for the South Devon area. Through different forms of analysis, I have been able to determine the social and environmental effects of the SDLR. This has been achieved through the collection of noise pollution data to investigate environmental impacts and Public Transport Accessibility Level data to determine some of the social impacts. A social media survey has also been carried out to establish how local residents have received the impacts of the road. Property prices have also been used in conjunction to evaluate the primary data.

4a Evidence of organisation and sequence

Some images in this document have had to be removed for copyright reasons.

[1] *South Devon Link Road*. (n.d.). Retrieved from Torbay Development Agency : http://www.torbaydevelopmentagency.co.uk/projects/regeneration/south-devon-link-road

[2] *South Devon Link Road opens between Torbay and Newton Abbot*. (2015, December 15). Retrieved from BBC: https://www.bbc.co.uk/news/uk-england-devon-35094341

[3] Campaign for Better Transport. (n.d.). *Failings of the consultation process for the Kingskerswell Bypass*. Retrieved from Better Transport: https://bettertransport.org.uk/sites/default/files/research-files/kingskerswell-sdlr-consultation-oct11.pdf

1b Clear referencing of sources (Harvard type)

Locational Context

The research takes place within the district wards of Kerswell-With-Combe and Buckland and Milber in South Devon.

[4]

Figure 1a, 1b: Maps showing the location of my research areas from a national, regional and local scale.

[4] (n.d.). Retrieved from Google Maps: http://www.google.com/maps

1b
Clear referencing of sources (Harvard type)

Figure 2: A map showing the route of the South Devon Link Road in yellow. The road skirts the ward of Buckland and Milber and bypasses the village of Kingskerswell in Kerswell-With-Combe.

Hypothesis and aims

Aims

1. To determine the extent of the environmental impact of the South Devon Link Road.
2. To determine how the South Devon Link Road has impacted upon the quality of life of local residents in two different areas.

Hypotheses

1. The South Devon Link Road has had more of a negative impact on the environment in Buckland and Milber than in Kerswell-With-Combe.
2. The South Devon Link Road has had more of a negative impact on the quality of life in Buckland and Milber than it has on Kerswell-With-Combe.

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How the title links to the specification

3.2.2.1 The nature and importance of places

The concept of place and the importance of place in human life and experience. Insider and outsider perspectives on place.

Categories of place: near places and far places experienced places and media places.

Factors contributing to the character of places:

Endogenous: location, topography, physical geography, land use, built environment and infrastructure, demographic and economic characteristics.
Exogenous: relationships with other places.

The investigation will include a social media survey that assesses the impact of the SDLR on insider perspectives of the Buckland and Milber and Kerswell-With-Combe wards.

3.2.3.7 Other contemporary urban environmental issues

Environmental problems in contrasting urban areas: atmospheric pollution, water pollution and dereliction.

The investigation will assess how the construction of the road has potentially created or alleviated environmental issues in contrasting urban areas.

3.2.3.8 Sustainable urban development

Impact of urban areas on local and global environments. Dimensions of sustainability: natural, physical, social and economic. Concept of liveability.

The investigation will analyse the impact of the South Devon Link Road on social factors in Buckland and Milber and Kerswell-With-Combe, specifically the concept of liveability. This concept is defined as the characteristics of a city which improve the quality of life for the people living there.

1a
Thorough understanding of specification links

Rationale for each hypothesis

1. **The South Devon Link Road has had more of a negative impact on the quality of life in Buckland and Milber than it has on Kerswell-With-Combe.**

Quality of life refers to the degree to which an individual is healthy, comfortable, and able to participate in or enjoy life events, especially in regard to the living conditions in which an individual finds themselves in[5]. It is generally regarded that social, physical, political and economic factors can all impact the quality of an individual's life[6]. This is shown in the figure below.

1b
Clear rational for hypothesis

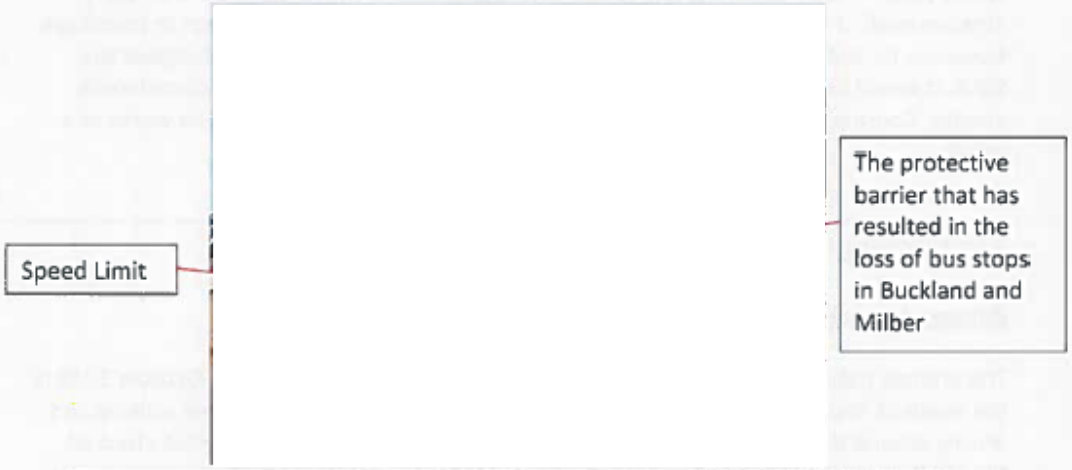
Figure 3: A diagram showing the different aspects of quality of life.

The construction of infrastructure can have a significant effect on these factors and can therefore impact on the quality of life of residents. Infrastructure refers to the services considered essential to enable or enhance living conditions, such as transport communications like roads, railways and canals. Roads in particular can have significant implications on the quality of life of local residents. In general, past road construction projects have considerably improved the quality of life in the urban areas where the traffic has been bypassed. However, urban areas where a bypass travels through or adjacent to have witnessed living standards suffer. Previous road construction projects, such as the Okehampton Bypass in West Devon have been well documented on this effect. For example, when questioned on the impact of the road, 80% of local residents agreed that the

[5] Jeckinson, C. (2019, January 2). *Quality of Life*. Retrieved from Encyclopaedia Britannica: https://www.britannica.com/topic/quality-of-life#ref334025

[6] et al, Skinner. (2016). *Geography for A-Level and AS, Fourth Edition.*

town had benefited from the diversion of traffic[7]. However, those nearest to the road have been more negatively affected. Therefore, when considering the construction of the SDLR, it is logical that the bypass would alleviate negative social issues and improve the quality of life in Kingskerswell, whilst creating an opposite effect for the ward of Buckland and Milber. This is particularly the case in terms of access to amenities, such as public transport, which this investigation focuses on. The design of the SDLR has resulted in a physical barrier being erected between the residents of Milber and the new road in the form of a wall. However, despite its intention of mitigating against noise pollution and adding extra safety precautions, this barrier has culminated in the loss of access to main line bus stops for the residents of Milber and Buckland. As a result, it would be expected that these residents, particularly the elderly who are more reliant on public transport would find access to leisure spaces, jobs, schools and healthcare more difficult. However, when considering Figure 3, these factors comprise only a small section of the determinants of quality of life and therefore, the investigation focuses only on elements directly affected by the access to public transport. Despite this, when considering these factors, it would be expected that in Buckland and Milber, these determinants would fall in quality and so the overall quality of life in this ward would fall. In theory, this effect should be reflected by a decrease in house prices in those areas worst affected by the loss of access.



(Above) Figure 4: A picture showing the creation of a protective barrier on the SDLR near Buckland and Milber. The barrier has resulted in the loss of bus stops for the ward.

[7] Mudge, G., & Chinn, L. (1997, January 1997). *The impact of the Okehampton Bypass.* Retrieved from The Future of Transport: https://trl.co.uk/reports/TRL268

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2. **The South Devon Link Road has had more of a negative impact on the environment in Buckland and Milber than in Kerswell-With-Combe.**

The construction of major infrastructure projects such as roads can also affect the local environment. In general, the existence of high capacity roads can create adverse environmental effects. Shifting hydrological patterns, an increased number of landslides, the destruction of habitat, increased air and noise pollution (which will be focused on in this investigation) and many other impacts can all be caused due to the construction of roads[8]. Arguably one of the most serious environmental implications that highways can cause is the creation of noise pollution which occurs when there is either "excessive amounts of noise or an unpleasant sound that causes temporary disruption in the natural balance"[9]. The severity of noise pollution is often overlooked during the planning stages of a construction project. Hearing loss through constant exposure to noise, mental health issues, sleeping disorders, cardiovascular issues and ill effects on wildlife can all be induced by noise pollution being emitted by high capacity roads. This is notable, as noise pollution can adversely impact the quality of life and ability of a citizen to enjoy living in their local area, in particular when exercising[10]. Other areas of the UK, such as in Wadesmill in Hertfordshire have experienced this effect, with a paper commissioned by the Campaign to Protect Rural England finding that the A10 bypass had a "significant effect on people's quiet enjoyment of the countryside"[11]. Consequently, due to the SDLR's diversion of traffic around the village of Kingskerswell, it would be expected that noise pollution levels would be lower in the village. However, for the residents of Buckland and Milber, who are forced to live alongside the SDLR, it would be expected that their exposure to noise pollution would be considerably greater. Consequently, the environmental conditions would be expected to be worse as a result.

1b Well developed theoretical context

1a L4 - Hypotheses effectively identified. Fully referenced to specification

1b L4 - Thorough use of literature sources. Detailed theoretical and comparative contexts.

Methodology

Primary data collection

The primary data for the effects of noise pollution was collected on the 26th October 2018 in the wards of Kerswell-with-Combe and Buckland and Milber. This involved me walking and driving around to various points within the two wards in order to determine the effect of the SDLR on the environment and the quality of life for the residents of the two wards. For

[8] Daigle, P. (2010). A summary of the environmental impacts of roads, management responses, and research gaps: A literature review. *BC Journal of Ecosystems and Management*.

[9] Conserve Energy Future . (n.d.). *Understanding Noise Pollution*. Retrieved from Conserve Energy Future : https://www.conserve-energy-future.com/causes-and-effects-of-noise-pollution.php

[10] Laskowski, E. R. (n.d.). *Does air pollution make outdoor exercise risky? What if you have asthma or another health problem?* Retrieved from Mayo Clinic: https://www.mayoclinic.org/healthy-lifestyle/fitness/expert-answers/air-pollution-and-exercise/faq-20058563

[11] Sloman, L., Hopkinson, L., & Taylor, I. (2017). *The Impact of Road Projects in England.*

both wards, I adopted a systematic approach, where I placed two grids over maps of the two wards. I eliminated numerous individual grids from both maps as the land had not been developed and so it would be impossible to measure any quality of life or living condition change. After I had eliminated these grids, I was able to use a random sampling method using a random number generator to identify roads from which I could collect noise pollution levels from. Following this, I drove to the selected roads in order to collect the noise pollution data. I was able to collect this noise pollution data through the use of a sound meter. However, this method of selecting roads meant that they were often not central to the grid selected. Thus, limiting the accuracy of my data. Additionally, for the collection of my data detailing the impact of the SDLR on the quality of life of the two wards, I was able to use an interesting calculation used by several City councils across the UK that measures the accessibility of public transport to residents. For this, I used the calculation used by Manchester City Council named the Greater Manchester Accessibility Level (GMAL)[12] calculation. This involved finding the distance of a road in every applicable grid to the nearest mainline bus stop. However, as with the collection of my noise pollution data, I was not always able to find a central road from which to collect my data from. Additionally, the collection of Public Transport Accessibility Level (PTAL) data only recorded the "as the crow flies" or geodesic distances and did not include any variation that would be caused by changes in the relief of the environment. Finally, a social media survey was undertaken that was distributed on local community Facebook pages. The survey provided me with qualitative data that can be used to collect personal experience of locals on the social and environmental impacts of the SDLR.

2a Sampling strategies

2b Explanation of methodology

(Below) Figure 5a, 5b: maps showing the division of the two wards into a series of grids.

[12] Manchester City Council. (n.d.). *Greater Manchester Accessibility Levels (GMAL) Model.* Retrieved from http://odata.tfgm.com/opendata/downloads/GMAL/GMAL%20Calculation%20Guide.pdf

Secondary data collection

The secondary data was collected from an online source which allowed me to examine house prices throughout the Buckland and Milber and Kerswell-With-Combe wards. This, in theory, would support any evidence and help to prove or disprove my two hypotheses. For example, if the collection of noise pollution data suggested that Buckland and Milber experiences higher noise levels, then house price data should reflect this trend by revealing lower house prices in this ward. Or at least, lower property prices in areas where noise pollution is at its greatest. This is, in essence, a financial reflection of the environmental conditions and standard of living in the two wards. However, this use of quantitative data only provides a numerical portrayal of how living conditions have changed based on the demand for property. It does not offer any insight into the perspectives and opinions of people living in Kerswell-With Combe or Buckland and Milber.

2a Explanation of sec data sources

The South Devon Link Road has had more of a negative impact on the quality of life in Buckland and Milber than it has on Kerswell-With-Combe.

2a Sampling justification

The impact of the SDLR on quality of life in the two wards was measured through the use of a calculation used by Manchester City Council named the Greater Manchester Accessibility Level (GMAL) calculation. For this, I adopted a strategic sampling method which involved placing a grid over maps of both wards and then eliminating squares without any housing developments, as the calculation is only applicable for grids containing residents. Then, the nearest main route bus service stops have to be identified for each ward. The purpose of this is to maximise the accuracy of the calculation, as a local bus route service is not always as beneficial to residents, as it cannot connect them to the main local economic centres. For this investigation, it is presumed that the main line bus services will have the most influence on quality of life, as these routes can connect residents to a larger number of facilities, such as hospitals, schools, leisure spaces, etc. It is these facilities that constitute a large proportion of the factors that determine quality of life. For both wards, the Number 12 Stagecoach bus service that connects Newton Abbot to Torbay is the nearest main route bus service.

2b Explanation

Figures 6a and 6b: maps showing the locations of bus stops in both wards.

The next stage of the calculation is to identify a road nearest the centre of a selected grid and measure its geodesic distance to the nearest bus stop. This distance was calculated using the Google Maps measure feature. This process was repeated for every applicable grid in the two wards. However, one limitation of this method is that for some grids, there are no roads in the centre of the square. Therefore, the accuracy of the distance to bus stop measurement is limited in some cases. The next stage of the calculation is to determine the time taken to walk to the bus stop. This is done by multiplying the geodesic distance by the average human walking speed of 1.4m/s. However, this could result in inaccuracies as not all humans walk at the same speed. This is especially relevant considering the demographics of the two wards which includes a high proportion of elderly people, who tend not to walk as fast. The next stage of the calculation is to determine the scheduled waiting time that users of the service would be expected to endure. This is the time between when a user arrives at a bus stop and when the service arrives. As per the method used by Manchester City Council, the calculation used is SWT (scheduled waiting time) = 0.5 x (60/frequency of the service). Therefore, as during peak hours, the Number 12 bus service arrives once every 10 minutes (6 times an hour), a passenger would be expected to wait on average 5 minutes. The Average Waiting Time is then added to the Walk Time which provides the Total Access Time. Finally, this data is converted by dividing by 30 to find the Equivalent Doorstop Frequency. This data can be used to find the accessibility level of a certain area. The scale that the scores are based on ranges from a level of 1 (very poor access to public transport) to 8 (excellent access to public transport).

2b Systematic explanation

2a Frequencies and timings stated

The South Devon Link Road has had more of a negative impact on the environment in Buckland and Milber than in Kerswell-With-Combe.

The collection of data determining the environmental impact of the SDLR took place on the evening of 26th October 2018 roughly between 17:00 and 18:00. This involved the collection of noise level data throughout the two wards. Similar to the collection of data in the first hypothesis, the two wards were segmented into a series of grids. From this, I was able to use strategic sampling whereby grids where there is no human development could be removed as the road's impact on human settlement would not be relevant here. After removing these squares, I proceeded by using a random number generator to select squares to take data from. Ten locations in each ward were selected and similar to the collection of accessibility level data, I would try to find a road nearest the centre of the grid. Here, with a sound meter, I would take five measurements over a five-minute period with one-minute intervals. I would then calculate the average reading. By doing so, any anomalous data would be able to be identified and removed. Therefore, removing the risk of interference by sporadic noise sources that may distort the true noise pollution caused by cars. This should improve the accuracy of the data. The data for this would be recorded in decibels (dB). Of course, being directly adjacent to the SDLR, it would be expected that the ward of Buckland and Milber would experience significantly greater noise pollution levels. By collecting data from several points in each of the two wards, it was possible to determine any hotspots of noise pollution and which areas were least so affected. Additionally, this will allow the data to be plotted against the distance from the SDLR, which can be found by measuring the nearest geodesic distance to the road. This will show any correlation between the two variables and therefore, a judgement can be made on which ward's environment has been the most heavily affected by the road. However, this method of data collection may be

2a Sampling, frequencies

2b Clear explanation

limited, as the collection took place during rush hour on a Friday night. Therefore, this could create an exaggerated portrayal of the environmental conditions in the two wards, as the traffic would be at its greatest. This would not be a comprehensive outlook of the situation, as the levels would likely be lower during other times of the week.

Figure 7: A photo of myself recording noise pollution data in the Kerswell-With-Combe ward.

3b
Awareness of unrepresentative sample size

Figure 8: A photo of Aller Brake Road, in the ward of Buckland and Milber.

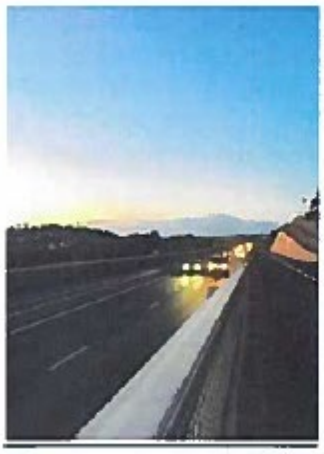


Figure 9: A photo of the SDLR during rush hour on Aller Brake Road.

Social Media Survey

As well as this, a social media survey has been undertaken to collect qualitative data on the personal opinions on the impact of the SDLR. For this, the website www.surveymonkey.com[13] has been used to create a very short survey asking questions on how local residents of the Buckland and Milber and Kerswell-With-Combe wards have perceived the social and environmental changes since the opening of the road. The length of the survey was intentionally kept to a minimum to ensure that as many citizens as possible would voice their opinions.

3a Appropriate technique, with justification.

The survey included six questions:

1. Q: Where do you live?
   A: 1. Kingskerswell 2. Buckland and Milber
2. Q: How would you describe the level of noise pollution where you live?
   A: 1. None at all 2. A little 3. A moderate amount 4. A lot
   5. A great deal
3. Q: How would you describe the levels of noise pollution where you live now compared to before the opening of the South Devon Link Road?
   A: 1. Worse 2. About the same 3. Better
4. Q: How would you describe your access to bus services?
   A: 1. Bad 2. Average 3. Good
5. Q: How would you describe your access to bus services where you live now compared to before the opening of the South Devon Link Road
   A: 1. Worse 2. About the same 3. Better
6. Q: Overall, how would you describe the South Devon Link Road's impact on your quality of life?
   A: 1. Very Negative 2. Negative 3. Neutral 4. Positive
   5. Very Positive

[13] (n.d.). Retrieved from Survey Monkey: www.surveymonkey.com

Following this, a message and link to the survey was sent to the administrators of two local community Facebook pages – "Spotted Newton Abbot"[14] and "Spotted: Kingskerswell"[15]. The administrators then posted this on their respective pages and distributed the survey link to local followers of the page. The post was deliberately targeted at the residents of Buckland and Milber and Kingskerswell to ensure that the results were strongly linked to my hypotheses. However, the accuracy of the survey can be brought into question, as the binary choice between the two options could lead to participants from outside the two wards taking the survey. This could potentially result in outsiders answering the survey and not providing truly accurate information. However, despite the risk of inaccurate information, the use of a social media survey is still useful, as the two respective pages have a large following. For example, Spotted Newton Abbot has a following of 23,500 Facebook users and Spotted Kingskerswell has 1,600. Therefore, the use of Facebook as a platform is highly valuable as it can expose the survey to a large number of residents. This can be witnessed by the fact that a highly pleasing 98 people had undertaken the survey within 24 hours and 129 within four days. Despite this, one limitation of the use of the platform "Survey Monkey" is that the answers for only 100 responses can be accessed without upgrading to a costly plan.

2a Method justified

2b Full explanation

4b Evaluates method

Figure 10: A screenshot of the Facebook post on a local community page.

[14] *Spotted Newton Abbot*. (n.d.). Retrieved from Facebook: https://www.facebook.com/SpottedNewtonAbbot/

[15] *Spotted: Kingskerswell*. (n.d.). Retrieved from Facebook: https://www.facebook.com/spottedkingskerswell/

AQA
Realising potential

Secondary data

For the collection of my secondary data, I have used the website rightmove.co.uk[16] and its database to find the prices of properties sold in individual postcodes in each ward in the last two years. The results have been filtered to include only those properties sold in the last two years as this will reveal the impact of the opening of the SDLR on property prices. The postcodes selected will be in the same ten randomly generated grids as the collection of noise pollution data. After this, I will be able to find the average house price for each postcode and plot this data against nearest results for the GMAL calculation and noise pollution for to see if there is any correlation. I will use statistical methods to see if there is any correlation between the two. It would be expected that if there was any correlation, it would be that the greater the accessibility index score, the greater the property value. Also, it would be expected that the lower the levels of noise pollution, the greater the land value. The results will be used in conjunction with the primary data to support or disprove the two hypotheses.

2b Thorough explanation

2a - Wide range and thorough justification of methods, with sampling size and type stated.

2b - Detailed explanation of methods

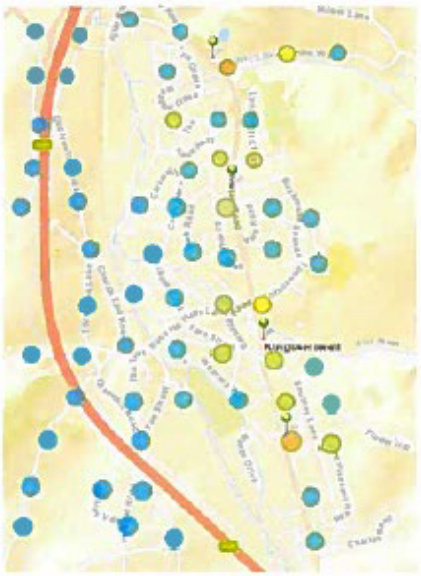
2c - Comprehensive programme of data collection, all carried out

[16] (n.d.). Retrieved from rightmove: https://www.rightmove.co.uk

Presentation, analysis and interpretation of results

1. **The South Devon Link Road has had more of a negative impact on the quality of life in Buckland and Milber than it has on Kerswell-With-Combe.**

[17]



Key:

Accessibility Level	Range of Index Scores	Map Colour
Very Poor 1	0.<=0.1	
2	>1.<=2	
3	>2.<=3	
4	>3.<=4	
5	>4.<=5	
6	>5.<=12.5	
7	>12.5<=17.5	
Very Good 8	>17.5	

= Bus stops

3a
Clear
presentation

(Above) Figure 12: a table showing the GMAL Index Scores and their corresponding colour on the GIS maps.

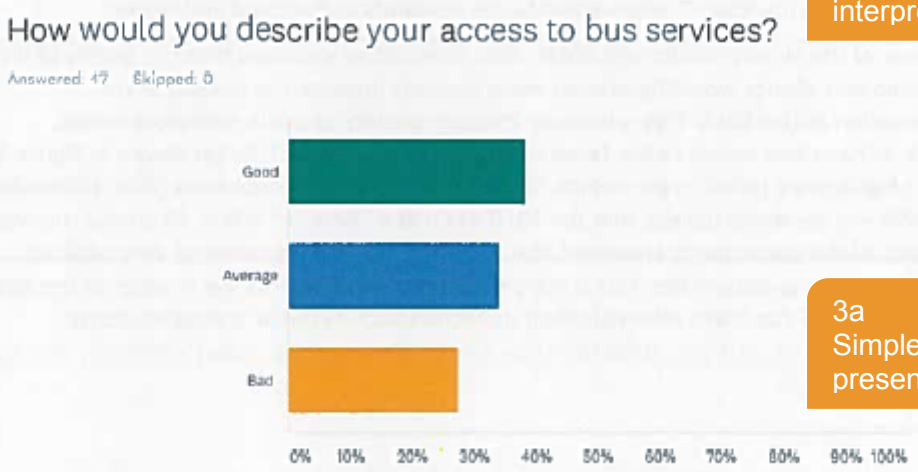
Figure 11a, 11b: Two GIS maps which show the difference in public transport accessibility levels between the two wards, based on the GMAL calculation.

[17] Created using Arc GIS: https://www.arcgis.com/index.html

The map on top and the data in the appendix show the accessibility levels of the ward of Buckland and Milber to main route bus services. As shown by the map, the ward only has access to one main route bus stop. This is due to the construction of a protective barrier which has removed access to any pre-existing bus stops. As a result, the ward has a considerably poorer connection to public transport than Kerswell-With-Combe does. This is reflected by the ward's high level of poor scores and only one measurement of a reasonable index score of between 4 and 5 on the GMAL scale. This trend indicates that residents of the Buckland and Milber ward have a reduced access to major local economic centres and therefore public services.

This trend is supported by the results of the social media survey (shown below), as of the 47 residents of Buckland and Milber who took part, 13 (28%) described their access to bus services as being "Bad" and a further 16 (34) described their access as "Average". Naturally, those positioned closer to the ward's only bus stop would feel like they have good access and so 18 (38%) participants described their access as "Good". The high proportion of participants that feel their access is poor can most likely be explained by the fact that the ward now only has one bus stop, thus supporting the GMAL data.

3b Thorough interpretation



3a Simple presentation

Figure 13: A bar graph showing the survey results of the question "How would you describe your access to bus services?" when asked to the residents of Buckland and Milber.

The trend is further supported by the fact that 28% of Buckland and Milber's residents feel like their access has been reduced since the opening of the SDLR. This is shown by the bar chart below.

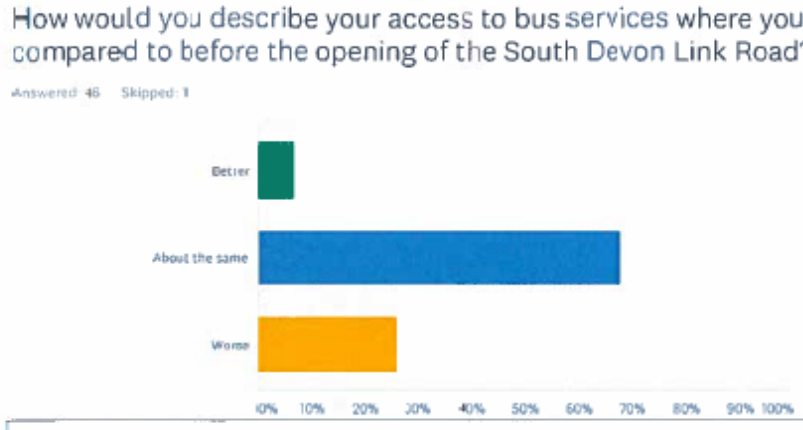


Figure 14: A bar graph showing the survey results of the question "How would you describe your access to bus services where you live now compared to befcre the opening of the South Devon Link Road?" when asked to the residents of Buckland and Milber.

Because of the survey results and GMAL data, it would be expected that the quality of life in Buckland and Milber would have been more severely impacted as a result of the construction of the SDLR. This is because through the lack of public transport access, residents have less access to the factors that comprise quality of life (as shown in Figure 3). This is highlighted below in the results of the survey, as a high proportion (26%) of Buckland and Milber's residents believe that the SDLR has had a "Neutral" effect. Of course, the vast majority of the participants answered that the SDLR had had a positive or very positive impact on their quality of life. This is likely because these residents live in areas of the ward where the SDLR has had a minimal effect on factors such as public transport access.

3b Critical examination of data

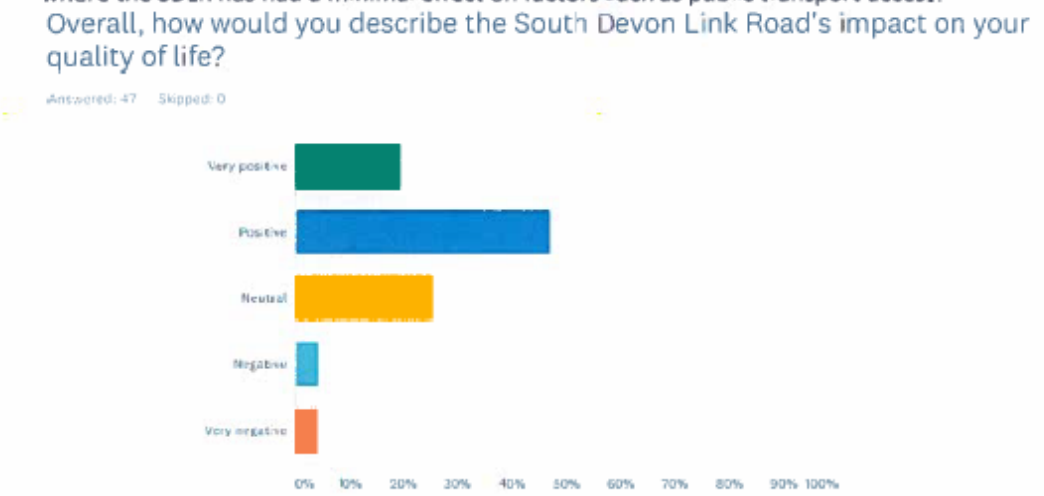


Figure 15: A bar graph showing the survey results of the question "Overall, how would you describe the South Devon Link Road's impact on your quality of life?" when asked to the residents of Buckland and Milber.

The second map shows the GMAL levels for Kerswell-With-Combe. The maps clearly reveal a contrast between the two wards, with Kerswell-With-Combe having an overall better access to main route bus services. This is shown by the ward having 4 bus stops compared to the one of Milber. As a result, this has increased the ward's overall proportion of reasonable to good results on the GMAL scale, with two results falling into the between 5 and 12.5 category. The ward of Buckland and Milber however sees no index scores of above 5.

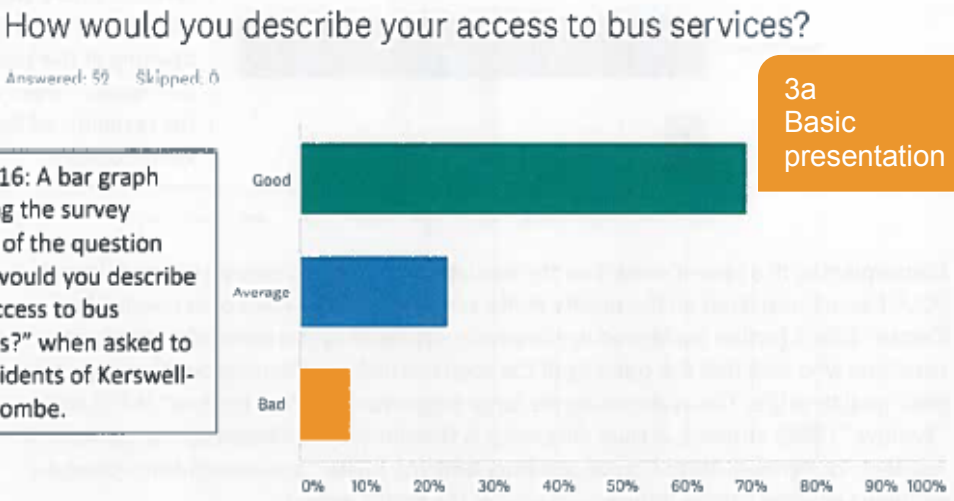


Figure 16: A bar graph showing the survey results of the question "How would you describe your access to bus services?" when asked to the residents of Kerswell-With-Combe.

3a Basic presentation

The stronger GMAL results and the notion that Kerswell-With-Combe has good access to public transport is reflected by the survey results, as of the 52 residents of Kerswell-With-Combe that took part in the survey, an extremely high 69% described their access as being "Good". From this, a clear distinction between the two wards is revealed, with 31% more people describing their access as good in Kerswell-With-Combe than in Buckland and Milber. A clear correlation can therefore be witnessed here, as the greater the GMAL Index Scores in Kerswell-With-Combe have led to a greater number of "Good" responses, whereas lower results in Buckland and Milber have resulted in more "Average" and "Bad" answers. This can be largely explained by the large disparity in the number of bus stops in each ward, with Buckland and Milber having just the one stop and Kerswell-With-Combe having four.

3b Thorough interrogation of data

The assumption that Kerswell-With-Combe has not seen its access to public transport decrease is further supported by the 83% majority of respondents that stated that they have not experienced any significant change. Furthermore, a smaller proportion of residents in Kerswell-With-Combe believe that their access has worsened compared to those in Buckland and Milber. (This is shown below).

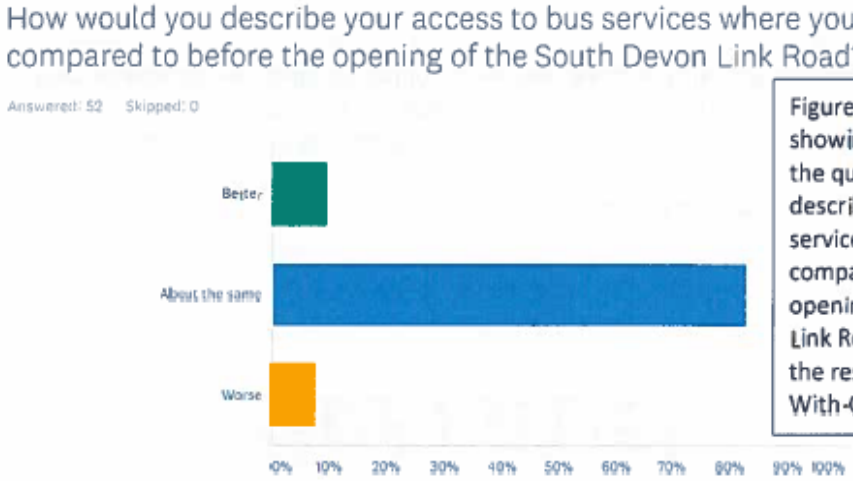


Figure 16: A bar graph showing the survey results of the question "How would you describe your access to bus services where you live now compared to before the opening of the South Devon Link Road?" when asked to the residents of Kerswell-With-Combe.

Consequently, this lack of impact on the availability of public transport suggests that the SDLR has not impacted on the quality of life as severely in the ward of Kerswell-With-Combe. This is further evidenced by the results provided by the Kerswell-With-Combe residents who said that the opening of the road has had a profoundly positive impact on their quality of life. This is shown by the large proportion of "Very Positive" (37%) and "Positive" (38%) answers. A clear difference is therefore shown between the opinions of residents of Kerswell-With-Combe and Buckland and Milber, as Kerswell-With-Combe's residents provide a more upbeat appraisal of the road's impact.

3b Effective interpretation

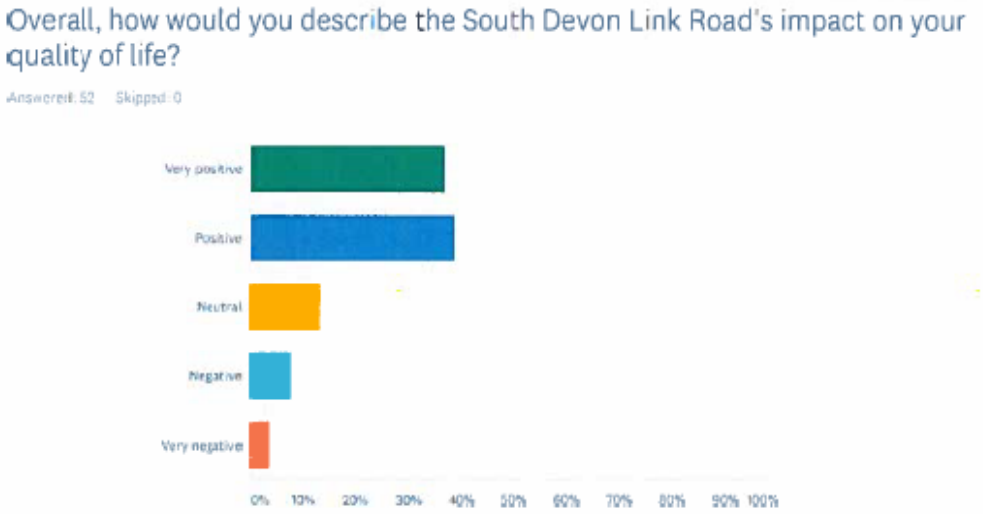


Figure 17: A bar graph showing the survey results of the question "Overall, how would you describe the South Devon Link Road's impact on your quality of life?" when asked to the residents of Kerswell-With-Combe.

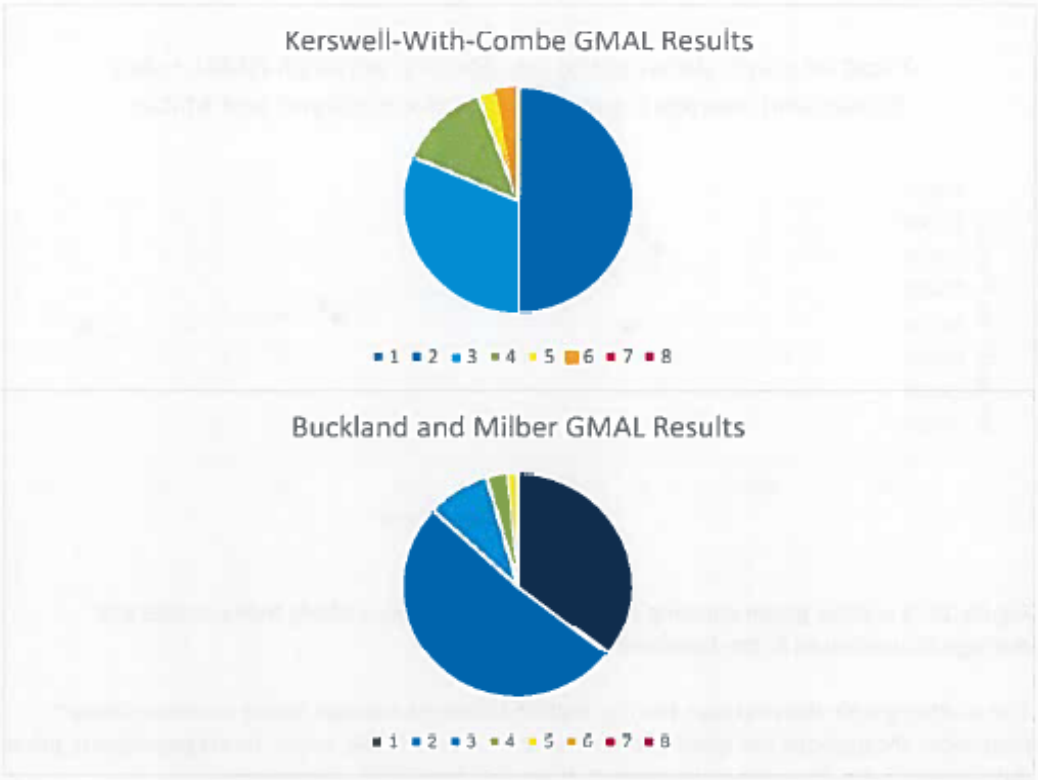


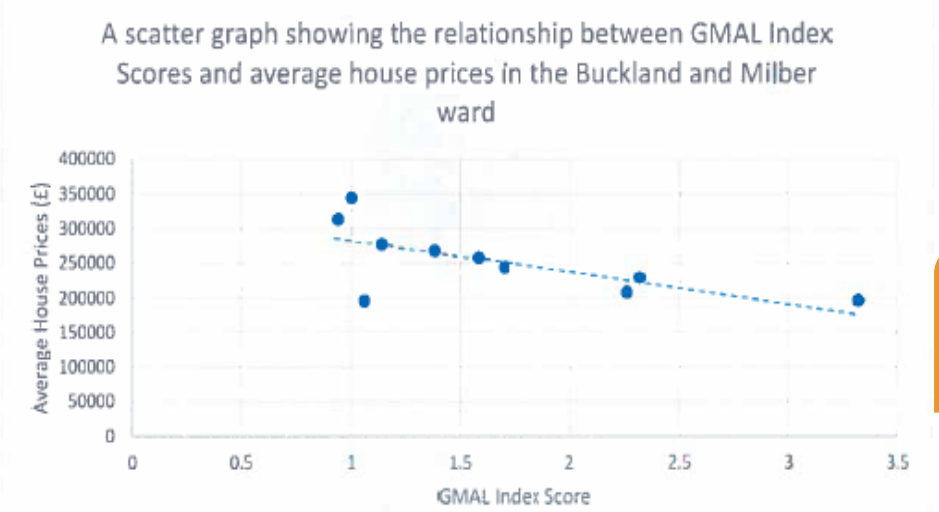
Figure 18a, 18b: Pie charts showing the proportion of Index Scores in the two wards.

The overall trend of the GIS maps is that Kingskerswell has better access to main route bus services, as shown in the two pie charts above by the greater proportion of reasonable and good index scores. However, on the whole, both wards score poorly on the GMAL Index, with the majority of areas over both wards having very poor scores. Overall, only a small number of areas combined between the two wards have reasonable to good access to public transport. This suggests for both wards that residents are not experiencing the maximum potential for their quality of life. However, the maps do suggest that in each ward, there is wide disparity in the accessibility levels.

3b Systematic interpretation. Some links between data sets

Due to the GMAL and survey results revealing that residents of Kerswell-With-Combe have a better connection to public services through the stronger availability of public transport, it suggests that residents have a better quality of life than in Buckland and Milber. This is because their access to the contributing factors of quality of life has increased. As a result, this supports the hypothesis.

Secondary Data



3a Clear presentation and analysis

Figure 19: a scatter graph showing the relationship between GMAL Index Scores and average house prices in the Buckland and Milber ward.

3a SCR, no significance test

The scatter graph above shows the correlation between average house prices in random postcodes throughout the ward and that specific area's GMAL score. Average property price data is used here to support the pattern shown by the GMAL calculations.

In this case, house prices are the independent variable and the GMAL Index Score is the dependent variable. The results reveal a relatively strong negative correlation with a Spearman's rank result of -0.63636. Therefore, suggesting that neither the null or alternative hypothesis are relevant. This is notable, as it was previously expected that because the SDLR has greatly reduced the access to public transport, as seen by the weak GMAL results compared to Kerswell-With-Combe, that property closer to bus stops would be more valuable, as it is an exclusive position within the ward. However, as shown by the results, this has not been the case. In fact, the negative correlation between the two variables shows that the opposite is true, with property value increasing as GMAL falls. For example, the most expensive housing tested (at £343500) only has a GMAL Index Score of just under 1 which would be considered "Very Poor". However, the cheapest property (at £196500) only has a GMAL score of just over 3.25 which would be considered "Reasonable". This could be explained by a potential lack of dependence by the local population on the use of public transport. Instead, it could be possible that the richer residents living in more expensive housing have a greater financial access to cars and so access to public transport is not seen as a necessity on the housing market. Consequently, for those residents living in cheaper housing in the ward, a reduced financial ability to possess motor vehicles means that public transport is more of a necessity. This explains the negative correlation between GMAL Index scores and property pricing. However, this result could also have been influenced by several other endogenous factors, such as the quality of housing, proximity to

3b Detailed interpretation

neighbourhood amenities and other physical attributes such as the topography of the area[18]. In this case, it would be expected that the lower costs of housing closer to Buckland and Milber's bus stop may be explained by the high levels of noise pollution. This was be explored further in the second hypothesis.

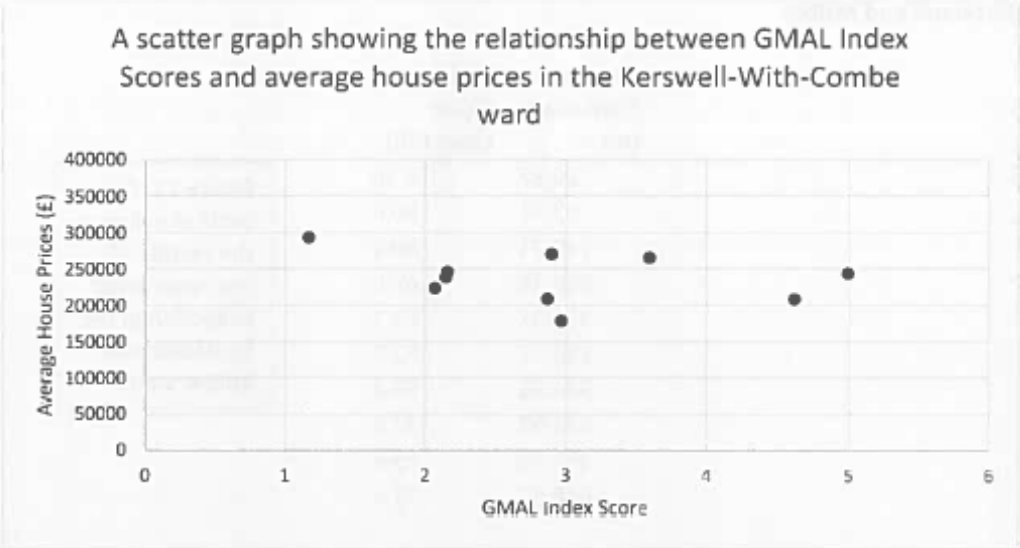


Figure 20: A scatter graph showing the relationship between GMAL Index Scores and average house prices in the Kerswell-With-Combe ward.

Similarly, the graph above shows the relationship between GMAL and average house prices but in the Kerswell-With-Combe ward. Similar to the Buckland and Milber ward, the results do not reveal an expected pattern that shows property prices rising with GMAL scores. However, instead of a negative correlation, here the data reveals no explicit correlation at all. This is supported by the result of -0.28485 as produced by the Spearman's rank test. This shows some similarities to the results for the Buckland and Milber ward, as it is clear that the housing market in these two wards places little importance on the availability of public transport. These results are reasonably surprising for the ward of Kerswell-With-Combe, as the ward's high accessibility to a number of bus stops and subsequent high results in the GMAL calculation would suggest that the quality of life here would be somewhat greater than in Buckland and Milber. However, the spread of bus stops throughout the ward may explain why there is little variation between the two variables. It would be expected that the high index scores would result in a greater quality of life in Kerswell-With-Combe and would be reflected through a positive correlation between the two variables. However, similar to the ward of Buckland and Milber, there is the potential for other endogenous factors that could distort the relationship between access to public transport and house prices. Consequently, a similar test, with all other things being equal, would likely have produced results that would have further supported my hypothesis.

3a SCR, no significance test

[18] *Factors affecting land value* . (n.d.). Retrieved from Planning Tank: https://planningtank.com/urban-economics/factors-affecting-land-value

As shown in the scatter graph above, there is a clear negative correlation between the distance from the road and the noise pollution levels. Or in other words, the further the distance from the road, the quieter the environment becomes. The correlation, according to the Spearman's rank test can be considered as being statistically significant, with the result being -0.80606. However, this result can only be said with 95% certainty, as there is 5% uncertainty based on the Spearman's rank significance levels. For this reason, it is possible to presume that there is an accurate relationship between the two factors. The data reveals some clear extremes, with the noise levels exceeding 90dB at 67.71m away from the road. This is particularly concerning for the environment of this particular ward, as it is widely regarded that sound can become dangerous at levels over 85dB, especially for prolonged periods of time. According to the website www.dangerousdecibels.org, exposure to persistent sound levels of over 85dB for only a week can cause permanent damage[19]. This is worrying for the residents of Aller Brake Road and Addison Road, who are permanently exposed to this level of sound, albeit at lower levels during other times of the week. Nevertheless, these persistent levels of noise can result in hearing loss, cardiovascular issues, sleeping disorders and undesirable effects on wildlife. This effect is revealed below on the GIS map which shows greater levels of noise pollution in the areas of the ward closest to the SDLR (A380).

3b Thorough analysis

3c Broader context

The GIS clearly shows that the areas of greatest noise pollution are situated nearest to the SDLR.

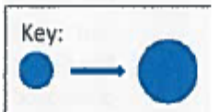


Figure 23: a GIS map showing the levels of noise pollution in the Buckland and Milber ward.

One possible explanation for the isolated high levels of noise pollution in the Buckland and Milber ward is the persistent breaking of the speed limit by motorists. During the planning stages of the road, it was promised to local residents that the road will have a 50mph speed limit enforced in order to keep accidents and noise pollution to a minimum. The planning and construction stages of the road consequently based their calculations of the road's

3a Effective presentation and analysis

[19] Dangerous Decibels . (n.d.). *Noise Induced Hearing Loss (NIHL)* . Retrieved from Dangerous Decibels : http://dangerousdecibels.org/education/information-center/noise-induced-hearing-loss/

impact on this premise. However, according to a recent Devon County Council document, due to some drivers' beliefs that the "speed limit is too conservative for the type of road"[20], the speed limit is consistently broken by motorists. Thus, raising the noise levels in the area. The extent of the speeding issue on the SDLR is exemplified by the headline of local news site, Devon Live, which details how frequently the speed limit is being disregarded[21].

3c Wider context

Police catch 80 drivers speeding on South Devon Highway in just 20 minutes

Figure 24: a headline from news site Devon Live.

The pattern of noise pollution being at dangerous levels within some parts of the Buckland and Milber ward can be supported by the results of the social media survey. The results show that 26% of the residents of the ward believe that they are exposed to "A moderate amount" of noise pollution, 10% believe they are exposed to "A lot" of noise pollution and 4% believe they are exposed to "A great deal". This goes to show that a significant proportion of the ward's residents feel as though the quality of their environment is adversely impacted by the levels of noise pollution. It is highly likely that these respondents live in the parts of the ward worst affected by the road. For example, the Aller Brake Road and Addison Road regions. Despite this, of course the majority of the residents polled feel as though they are only exposed to an insignificant level of noise pollution. This is shown by the 40% of residents answering that they are exposed to "A little" amount of noise pollution and 19% saying that they are exposed to "None at all". It is likely that these residents live in the easterly parts of the ward, where the noise emitted by the SDLR would mostly have dissipated and residents are exposed to normal levels of noise. This further supports the trend that some parts of the Buckland and Milber ward have been seriously environmentally affected and other parts have been to a lesser extent.

3b Thorough interpretation

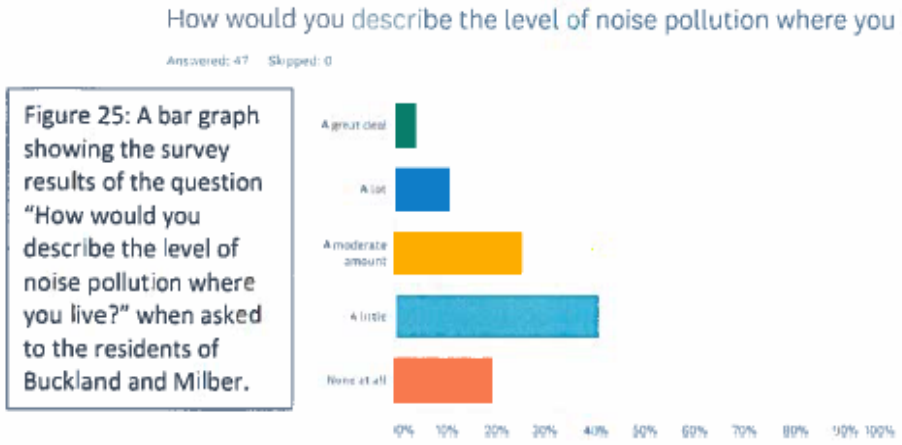


Figure 25: A bar graph showing the survey results of the question "How would you describe the level of noise pollution where you live?" when asked to the residents of Buckland and Milber.

[20] Chief Officer of Highways, Infrastructure Development and Waste. (2018, July 26). *A380 South Devon Highway: Average Speed Cameras*. Retrieved from https://democracy.devon.gov.uk/documents/s18535/bg090718tnh%20A380%20South%20Devon%20Highway%20Average%20Speed%20Cameras.pdf

[21] Greaves, P. (2019, January 29). *Police catch 80 drivers speeding on South Devon Highway in just 20 minutes*. Retrieved from Devon Live: https://www.devonlive.com/news/devon-news/police-catch-80-drivers-speeding-2422598

Furthermore, this trend is extended to the graph below which shows that 21% of the residents of Buckland and Milber feel as though the noise pollution in the ward has worsened as a direct consequence of the opening of the SDLR.

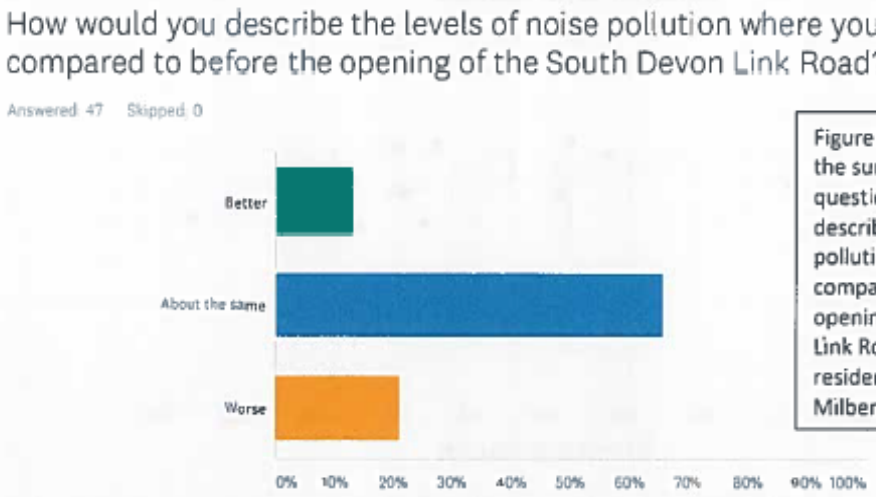


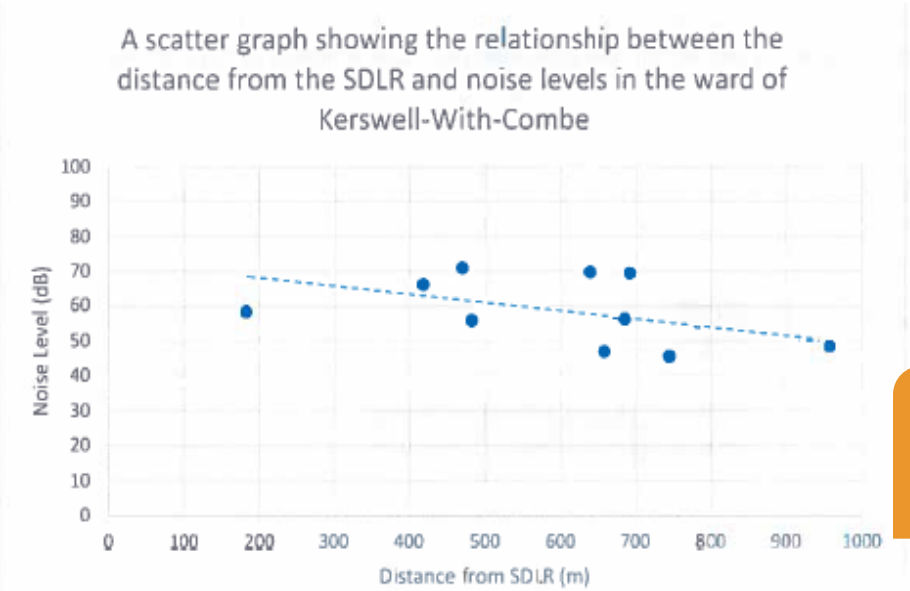
Figure 26: A bar graph showing the survey results of the question "How would you describe the levels of noise pollution where you live now compared to before the opening of the South Devon Link Road?" when asked to the residents of Buckland and Milber.

Kerswell-With-Combe

Distance from road (m)	Average Noise Level (dB)
658.51	47.3
481.12	55.8
468.96	70.9
419.26	66.1
685.9	56.4
692.32	69.4
744.14	46
639.87	69.7
182.26	58.5
958.18	48.5

(Above) Figure 27: A table showing the results of the noise level collection in the Kerswell-With-Combe ward.

As with the process for the Buckland and Milber ward, the results above show the relationship between distance from the SDLR and noise levels in Kerswell-With-Combe. Again, the grids were randomly selected after identifying and eliminating incompatible grids.



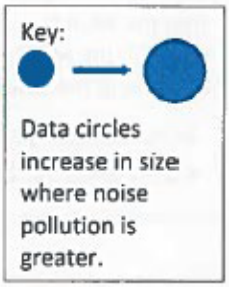
3a Effective presentation and analysis

Figure 28: A scatter graph showing the relationship between the distance from the SDLR and noise levels in the ward of Kerswell-With-Combe.

Similar to the other ward, the data in Kerswell-With-Combe (as shown by the scatter graph) shows a negative correlation between the two variables, with the ward becoming quieter the greater the distance from the SDLR. However, the graph also shows that on the whole, the ward is largely quieter. For example, the average noise pollution level for the ward of Buckland and Milber is 63.95, compared to only 58.86 for Kerswell-With-Combe. This is also shown by the smaller size of the data circles in the GIS map below. As well as the diversion of traffic away from the ward, this could also be likely to do with the fact that the collection of data for Kerswell-With-Combe started are at a greater distance (roughly 180m) from the road and therefore, most of the noise would have dissipated. On the other hand, the data from Buckland and Milber started from just over 25m away. Thus, limiting the validity of my results. Data points on the Kerswell-With-Combe graph also show isolated levels of high noise levels at a significant distance from the SDLR. This could be explained by the production of noise from vehicles on the pre-existing main route through Kingskerswell on the old Newton/Torquay Road. Nevertheless, this still clearly reveals that Buckland and Milber's environment has been more adversely affected than Kerswell-With-Combe's. Furthermore, unlike Buckland and Milber, the ward is less exposed to hotspots of dangerous noise pollution levels over 85dB. Conversely, due to the diversion of traffic and the subsequent reduction in engine noise, on the whole Kerswell-With-Combe experiences less isolated areas of extreme noise pollution. Despite this, the two graphs do reveal some similarities. For example, both reveal that the peripheries of the two wards have been much less severely affected, with noise levels stabilising at around 50dB for each of the two wards.

3b Full interrogation of data

Figure 29: a GIS map showing the levels of noise pollution in the Kerswell-With-Combe ward.



3a
Clear presentation of data

According to the results of survey, the residents of Kerswell-With-Combe agree with the findings, as the vast majority of residents describe their exposure to noise pollution as either "A little" or "None at all". This is a modest difference to the results of the same question to the inhabitants of Buckland and Milber, less describe their exposure to noise pollution as being either "A moderate amount", "A lot" or "A great deal". For instance, 9% less people believe that they are exposed to moderate levels of noise.

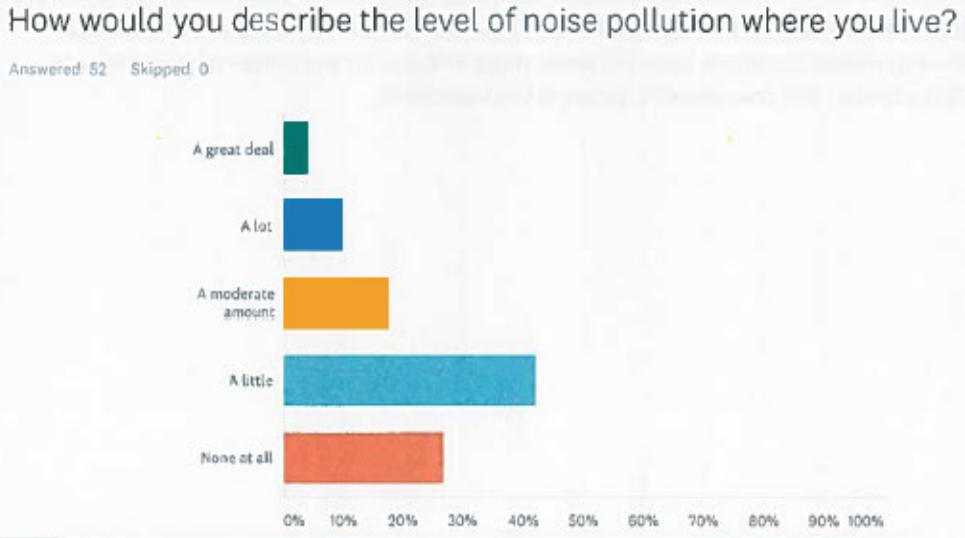


Figure 30: A bar graph showing the survey results of the question "How would you describe the level of noise pollution where you live?" when asked to the residents of Kerswell-With-Combe.

However, the most significant outcome of the survey is shown when asked how the opening of the SDLR has impacted on noise pollution levels. Here, a substantial 51% of residents believe that their exposure to noise pollution has become 'Better' since the opening of the SDLR. This is noteworthy, as when asked the same question the residents of Buckland and Milber had a far more negative response, with 66% of respondents saying that noise levels have not changed and 21 believing that they have become worse. Subsequently, this shows that the SDLR has achieved some of its aims, as it has significantly reduced traffic alleviated issues in the ward of Kerswell-With-Combe. However, this has been achieved at the expense of some of the residents of Buckland and Milber.

3b Thorough critical interpretation

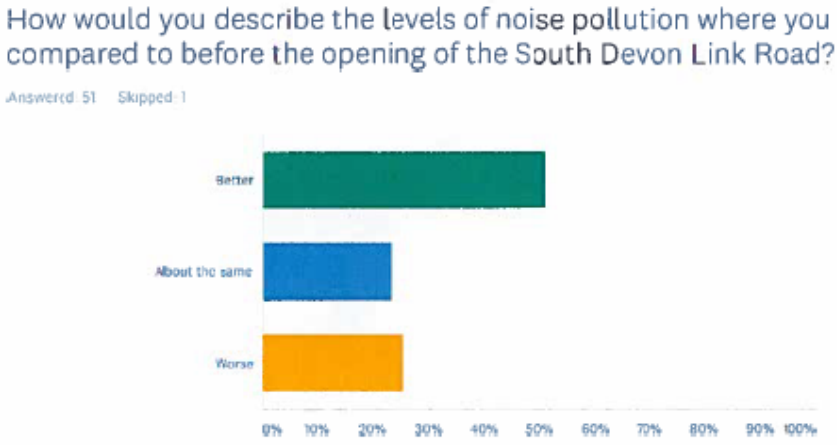
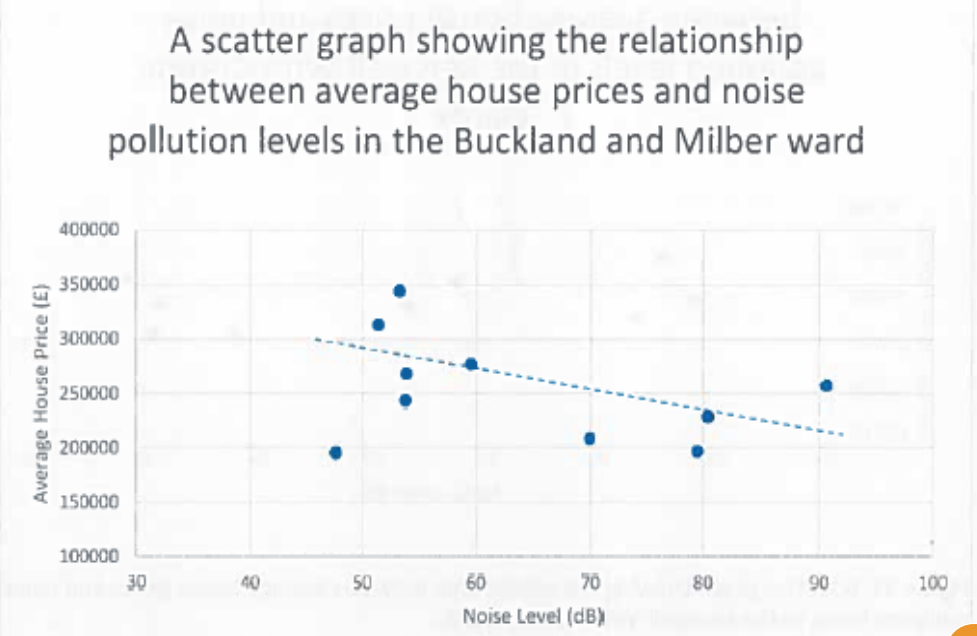


Figure 31: A bar graph showing the survey results of the question "How would you describe the level of noise pollution where you live now compared to before the opening of the South Devon Link Road?" when asked to the residents of Kerswell-With-Combe.

Due to the noise pollution data and results from the social media survey, it is clear that environmental conditions have worsened more in Buckland and Milber than in Kerswell-With-Combe. This consequently supports the hypothesis.

Secondary Data



(Above) Figure 32: A scatter graph showing the relationship between average house prices and noise pollution levels in the Buckland and Milber ward.

3a Effective presentation and analysis

The scatter graph above shows the largely negative correlation between noise levels and average house prices in the Buckland and Milber ward. The graph shows, for the most part, that when property is exposed to considerable levels of noise pollution, its value is considerably lower. For example, at 79.46dB, where the average property value is £196,500, whereas at 53.2, the average price is £343,500. This clearly shows that property which is near the dangerous noise pollution level of 85dB is considerably cheaper than in quieter areas, as these areas offer a better quality of life. However, there are some exceptions to his rule, such as the point shown at 47.6dB, where the average property price is £194,980. This challenges the general trend shown by the rest of the data, however it can be explained by a series of other price determinants. The quality of housing in this postcode could be considerably lower than the other low noise pollution areas and so can explain the abnormal result. Despite this, the overall correlation between noise pollution and house prices does suggest that the Buckland and Milber ward has been adversely affected by noise pollution being emitted by SDLR, as low land value has been created as a result.

3b Detailed interpretation

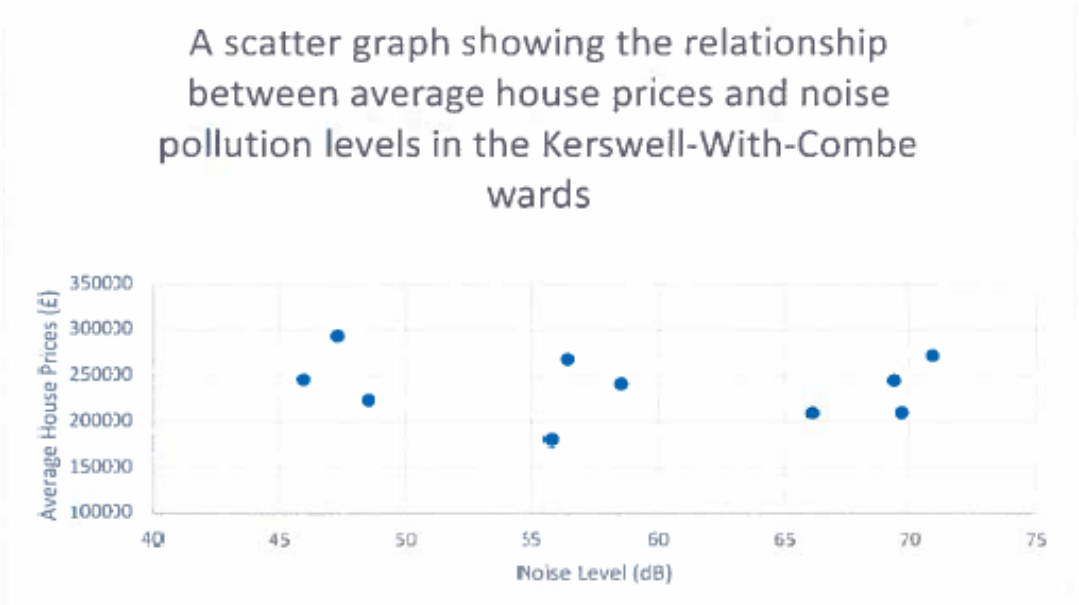


Figure 33: A scatter graph showing the relationship between average house prices and noise pollution levels in the Kerswell-With-Combe wards.

Similarly, the scatter graph above reveals the relationship between average house prices and noise pollution levels in Kerswell-With-Combe. However, unlike the trend shown with Buckland and Milber, the graph shows no particular trend between noise pollution and house prices. Dissimilar to the Buckland and Milber ward (which is exposed to isolated areas of persistently high noise pollution and subsequent low property prices), the Kerswell-With-Combe ward has no particular issue with dangerous noise levels. Consequently, this explains the lack of a clear correspondence with property prices in this ward. For example, at just under £250,000, the Kerswell-With-Combe property market includes property exposed to relatively low noise pollution (at around 46dB) and relatively high noise pollution (at around £244250). This supports the primary data results, as it reveals that the property market places no real significance over the environmental impact of noise emitted by the SDLR in the ward of Kerswell-With-Combe. On the other hand, for Buckland and Milber, the property market recognises the dangerous noise levels. Of course, there are other determinants of property prices that may interfere with these results. Despite this, this trend of more stable property prices in Kerswell-With-Combe, compared to the negative correlation shown by Buckland and Milber supports the primary data and therefore the hypothesis.

What I have learned from my investigation

My investigation into the social and environmental impacts of the SDLR in the wards of Buckland and Milber and Kerswell-With-Combe has certainly assisted with my knowledge of environmental problems associated with urban development in contrasting urban areas, therefore aiding my knowledge of the 3.2.3.7 section of the syllabus. Additionally, my

AQA
Realising potential

investigation has assisted my understanding of some of the elements of quality of life and liveability. Understanding how infrastructure development can affect these elements and sustainability has certainly positively impacted on my knowledge of my local area and the section 3.2.3.8 of the syllabus. Also, the investigation has also assisted my knowledge of the 3.2.2.1 section of the syllabus, as I have explored how the SDLR has impacted on two contrasting urban areas. The use of a social media survey has also permitted me to understand differences in insider perspectives of place and how endogenous and exogenous factors can influence these perspectives.

3c
Wider context of study acknowledged

Evaluation

I believe the evidence has certainly highlighted the differences in the effects of the SDLR on different geographical locations. Socially and environmentally, the primary and secondary data clearly reveals a general trend in that through the diversion of traffic away from Kingskerswell, negative issues associated with high volume roads have been alleviated. Whereas the generation of further fast flowing traffic in the Buckland and Milber ward has created undesirable social and environmental effects. A suitable use of qualitative and quantitate techniques were used to achieve this.

However, there are some clear limitations to the validity of my methodology. For example, the geodesic distances used for GMAL do not give a truly accurate portrayal of distances to bus stops. Roads and pathways are almost never in perfectly straight lines. Therefore, in reality it is likely that every index score would be shifted towards the "very poor" end of the spectrum. If I was to do this investigation again, I would certainly attempt to try to create a means where I could measure the shortest road distance to the nearest bus stop. However, for the purpose of this investigation, this is an adequate method, as it provides theoretical values which can be used to determine the SDLR's impact on social factors and the quality of life. Additionally, this is the recommended method, as used by Greater Manchester City Council. Furthermore, this does not include consideration for the topology of the two wards. Therefore, for some groups (particularly the elderly), any significant inclines would result in a slower walking time and so the accessibility index would fall.

4b
Evaluation of methods

Also, only a small sample size was used for collection of noise pollution – only ten data points for each ward were collected and so the repeatability of the investigation can be brought into question. This is because on another day, with a larger number of data sets, a different result may be produced. Because of this, only certain areas of both wards have been investigated. This is similar to the collection of house price data in some postcodes, as the sample size was particularly small. Some postcodes only have a small number of property sales in the past two years, whether others have multiple. As a result, the true average property value in each selected postcode may have been inaccurately represented.

3b
Reflects on sample size

As well as this, the collection of noise pollution data took place during a busy Friday evening during rush hour. Consequently, there would have been a greater volume of vehicles using the SDLR and therefore generating particularly high noise levels. If the collection of data was to take place at any other time during a typical week, the results would likely show a more realistic representation of conditions in both wards. However, this was somewhat mitigated as the collection of data took place during half term and so there would be less school traffic

3a L4 - Wide range of suitable techniques-both analysis and presentation
3b L4 - Thorough interpretation, linked to wider context
3c. L4 - Effective application of theory and concepts

on the roads. Subsequently, it can be expected that noise levels would be slightly less than in normal term time.

Finally, the methodology of the social media survey can be brought into question, as the binary choice between either "Buckland and Milber" and "Kingskerswell" when questioned on where the individual lives could lead to some outsiders untruthfully including themselves in the survey. To improve, more categories could be implemented, such as "Torquay", or more regional answers like "South Devon" for those outside of the two wards. However, in this case the hypotheses would have to change as the survey question would not be linked closely enough. However, this is largely mitigated by the large numbers of participants in the survey. This minimises the impact on the overall accuracy of the data of anomalous data from people outside of the two wards who do not insider experiences of the environmental and social impacts of the road.

4b Effective evaluation- limitations of methodology, possible improvements and wider context

Ethical issues

One of the main ethical issues relating to the collection of my data was having to walk around the two wards and sporadically taking measurements using a sound meter. This clearly could have aroused suspicions as to what I was doing. However, this was partially mitigated by the fact that I refrained from staying in one area for two long. Additionally, at a personal level, it is reasonably unfair to comment on someone's quality of life simply based on the impact of the construction of a high-volume road. Naturally, there are several determinants of quality of life that may be entirely personal and not influenced at all by public transport access or noise levels. Therefore, making a judgement about an individual's life based on their geographical conditions is somewhat unethical. This is similar to the collection of house prices, as it could be deemed as being unethical to make judgements about standard of living simply based on a postcode's average property price.

4b Understands ethical dimension

Conclusion

1. **The South Devon Link Road has had more of a negative impact on the quality of life in Buckland and Milber than it has on Kerswell-With-Combe.**

The collection of primary data for my first hypothesis suggests that this premise is, to a reasonable extent, true. Undoubtedly, through the use of the GMAL calculation, it is clear to see that the SDLR has had somewhat more of a negative effect on quality of life in Buckland and Milber than in Kerswell-With-Combe, as the ward's access to main route public transport services has declined. This is clearly shown by the larger proportion of low index results in the ward of Buckland and Milber and the greater proportion of reasonable index results in Kerswell-With-Combe. Certain demographic groups, such as the elderly, will be worst affected by this as they are more reliant on the use of buses. This trend is also supported (albeit to a lesser extent) by the social media survey results which reveals an inequality between the two wards. Therefore, using figure 3 and the quality of life theory, the reduced access to public transport is likely to result in decreased access to public services like healthcare, education, etc. Consequently, it can be inferred that this has resulted in a more substantial reduction in quality of life in Buckland and Milber. This is revealed in the quality of life question in the survey, as the residents of Kerswell-With-

4c Detailed summary of findings for each hypothesis

Combe gave a more positive portrayal of the road's impact. However, my results only support the hypothesis to a reasonable extent as my secondary data reveals a negative correlation in the relationship between GMAL Index Scores and average house prices. This can largely be explained by the fact that people in more expensive housing have the financial ability to possess cars and have less need for public transport so live further away. This questions the premise that social factors have been more negatively impacted in the ward of Buckland and Milber.

2. **The South Devon Link Road has had more of a negative impact on the environment in Buckland and Milber than in Kerswell-With-Combe.**

The relationship shown by my primary data strongly proves this hypothesis to be correct. The construction of the SDLR has undoubtedly caused more severe detrimental environmental effects in Buckland and Milber than in Kerswell-With-Combe. This can be seen by the dangerously high noise levels in individual areas of the Buckland and Milber ward. The sound level of 90.6dB recorded in Buckland and Milber highlights this issue, as it is in excess of the widely regarded value of 85dB which is classed as being 'dangerous'. On the other hand, the diversion of traffic around the village of Kingskerswell has culminated in the ward of Kerswell-With-Combe experiencing much safer environmental conditions, with lower and more stable noise levels. The survey results support this, with the majority of people questioned in Kerswell-With-Combe agreeing that noise levels have fallen. This is also supported by the much lower average noise level in Kerswell-With-Combe. This notion of environmental stability in Kerswell-With-Combe is reflected by the secondary results, which supports the primary data by revealing a negative correlation between noise pollution and average house prices in Buckland and Milber. The low property prices in Buckland and Milber in noise pollution hotspots clearly support the trend shown by the primary data. The lack of fluctuations in prices in Kerswell-With-Combe additionally support the theme of environmental stability in the ward. In the future, the pattern of noise pollution is likely to change, as with the imposition of new average speed cameras (as shown by the Devon Live headline below, drivers in theory should stick to the speed limit. This will cut noise levels in both wards and in particular in the hotspots of pollution in western parts of the Buckland and Milber wards.

New speed cameras installed on A380 to stop 'moronic drivers'

Figure 34: a Devon Live headline on the Council's decision to introduce average speed cameras.

Overall conclusion

In conclusion, it is clear that the SDLR has had a substantial social and environmental impact. The ward of Buckland and Milber has been generally more adversely affected than the ward of Kerswell-With-Combe. This effect was largely anticipated prior to the investigation due to previous case studies, such as the Okehampton. Here, the bypass had a similar impact as the SDLR, as the areas that witnessed a reduction in traffic volumes largely approved of the construction of the bypass. However, areas that saw a rise in traffic levels largely disapproved of the infrastructure project. Despite this, from the Government's perspective, the road project can be seen as a successful one, as the survey results show

4c
Link to wider/ comparative context

4c
Clear evidence-based overall conclusion

4a. L4 - Fluent and logical report. Wide range of presentation methods
4b. L4 - Effective evaluation, with link to wider context
4c. L4 - Thorough conclusion based on evidence

that out of everyone questioned, 71% of participants said that the SDLR has either had a positive or very positive effect on their quality of life.

As the qualitative and quantitative primary data largely achieved its aim of determining the extent of the road's environmental and social impact, it can be said that the investigation has indeed achieved its objectives.

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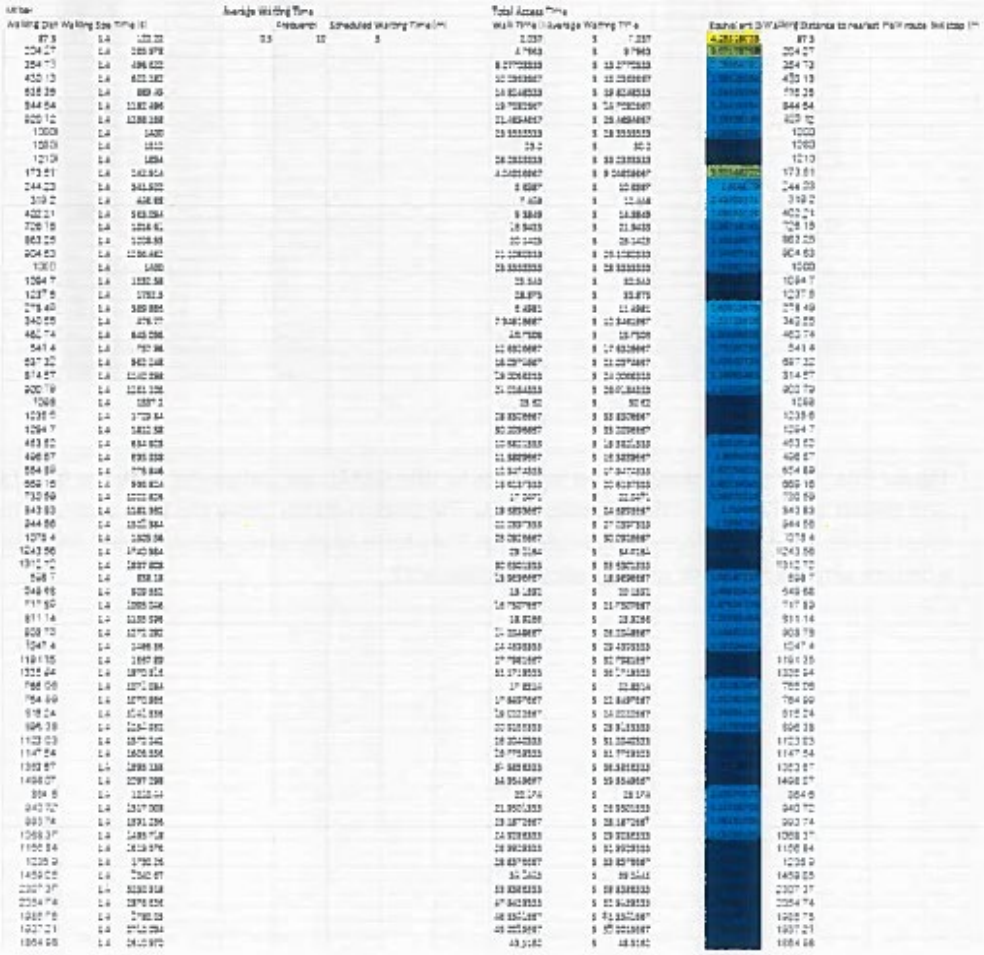
1b Thorough literature review

4a Evidence of organisation

Appendix



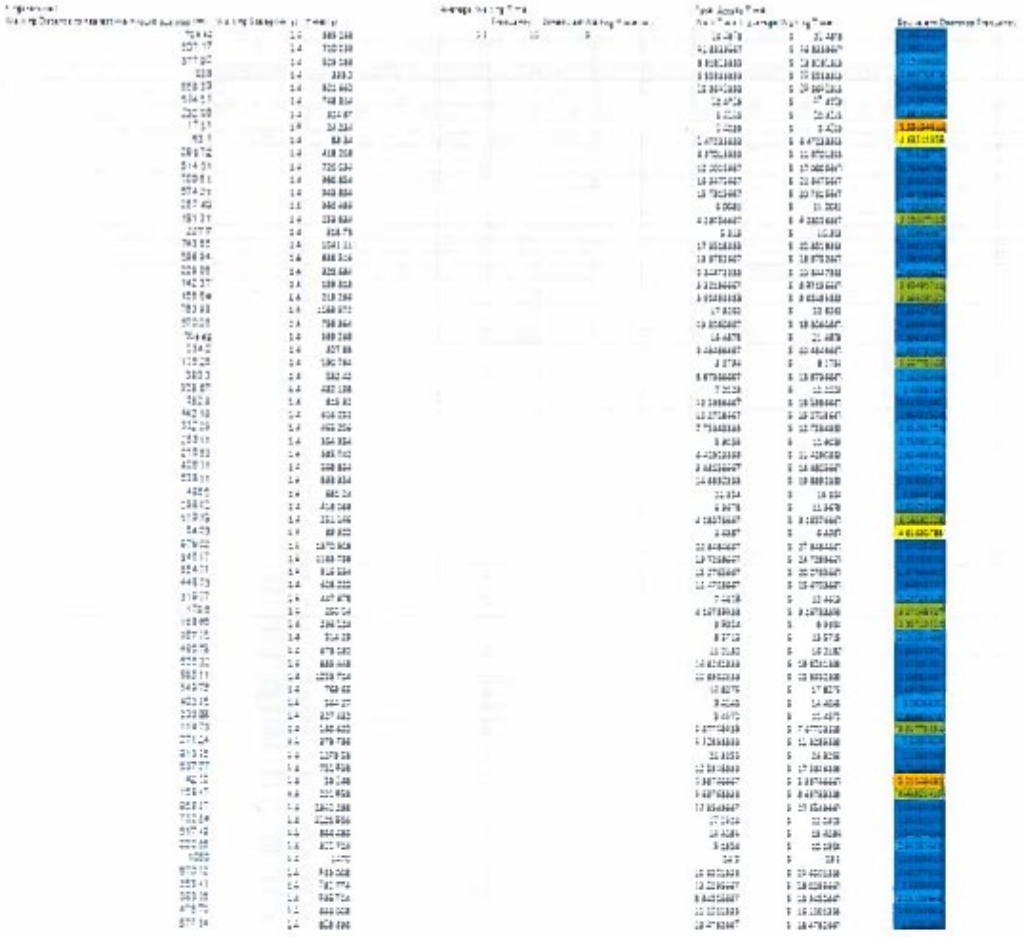


Figure 35a, 35b: tables showing the raw data for the GMAL calculation for both the Buckland and Milber and Kerswell-With-Combe wards. The coloured cells show the final accessibility level scores generated from the calculations. They have been colour-coded based on their position within the GMAL scale as shown in figure 12.

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