AS
GEOGRAPHY
7036/2

Paper 2 Human Geography and Geography Fieldwork Investigation

Mark scheme

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Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the typical performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

The notes for answers provide indicative content. Students' responses may take a different approach in relation to that which is typical or expected. It is important to stress that examiners must consider all a student's work and the extent to which this answered the question, irrespective of whether a response follows an expected structure. If in doubt the examiner should contact their team leader for advice and guidance.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Section A

<table>
<tr><th>Qu</th><th>Part</th><th>Marking guidance</th><th>Total marks</th></tr>
<tr><td>01</td><td>1</td><td><b>Which one of the following statements describes an ‘experienced’ place?</b>

<b>B</b> A place in which a person grew up.</td><td><b>1
AO1 = 1</b></td></tr>
<tr><td>01</td><td>2</td><td><b>In which of the following do both pieces of data show an exogenous characteristic of a place?</b>

<table><tr><td><b>C</b></td><td>A factory was built south of the village by an overseas company</td><td>A new eco-hotel has been built for tourists a few kilometres north of the village.</td></tr></table></td><td><b>1
AO1 = 1</b></td></tr>
<tr><td>01</td><td>3</td><td><b>Outline how oral sources, such as songs, can be useful when investigating people’s attachment to a place.</b>

<u>Point marked</u>

Award one mark for each relevant point with extra mark(s) for developed points (d). For example:

<u>Notes for answers</u>

Oral sources can include songs, poetry, interviews, reminiscences etc.<ul><li>Give a sense of place (1) and how it feels for them to be in that place, e.g., a positive or negative experience (1d)</li><li>How the local musicians/poets etc. perceive the place (positively or negatively) and/or how they feel others (outsiders) may experience or engage with the place (1d).</li><li>Use of examples to develop or illustrate are creditworthy. For example, the song ‘Dirty Old Town’, by Ewan MacColl, shows his attachment to the people of Salford but not the built environment (1d).</li><li>Sources may identify specific factors/events that contribute to a strong place attachment (1); for example, the memorial poem ‘This is the Place’, by Tony Walsh, gives a voice to the grief experienced in Manchester, following the terror attack in 2017 (1d).</li><li>Interviews or reminiscences give a sense of whether a person feels like an ‘insider’ (with lived experience) or an ‘outsider’ in the place (1)</li><li>As qualitative data, oral sources are more likely than quantitative sources to show an ‘emotional’ response to a place (1).</li></ul>The notes for answers are not exhaustive. Credit any valid points.</td><td><b>3
AO1 = 3</b></td></tr>
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<tr>
<td>01</td>
<td>4</td>
<td>

Analyse the continuity and change over time shown between Figure 1a and Figure 1b.

AO3 – Analysis of maps to show continuity and change over time.

Mark scheme

Level 2 (4–6 marks)
AO3 – Clear analysis of the maps provided, which makes appropriate use of map evidence in support. Clear connection(s) between different aspects of the map evidence.

Level 1 (1–3 marks)
AO3 – Basic analysis of the maps provided, which makes some use of map evidence in support. Basic connection(s) between different aspects of the map evidence.

Notes for answers
The question requires analysis of the map evidence shown in the figures and responses should focus on comparing the two maps.

- In 1950 the village has a nucleated pattern of housing mainly situated between the two main roads and to the north of the river. There is some ‘linear’ development of housing along the A road to the south and close to the station.
- By 2021 land area covered in buildings has more than doubled. A large housing estate has been built to the NE of the village centre and there is some ‘infill’ of new housing to the NE of the school. Areas to the south of the village, close to the river, have seen little development and there has been little expansion to the west of the village.
- There is some new development between the station/railway line, including some glasshouses and some further linear development on the main road heading SE.
- The network of minor roads and A roads is largely unchanged between 1950 and 2021. The Track to the ENE of the village has become a recognised road. However, a motorway (M11) has been constructed to the west, approximately 1km from the centre of the village. The motorway traverses open countryside but the built environment in the village has been largely unaffected.
- The station and the railway line to the west of the village remain unchanged between 1950 and 2021 and run NW to SE.
- There has been some change in land use on the western side of the motorway in the northern section of the map. An area here is now deciduous woodland whereas woodland to the east of the railway has gone, along with the area of marshland.
- The pattern of outlying farms remains largely the same in both maps.
- There are more amenities shown in the village in 2021, for example the school and the post office. However, some may recognise that this is a more detailed map and these may have also been present in 1950.
- Some may evaluate the use of OS maps with different scale, level of detail and areal extent for this analysis.

Reserve full marks for coverage of **both** continuity and change.
Credit any other valid approach.

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6
AO3 = 6

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01	5	**Assess the view that only qualitative data can represent 'insider' perspectives on a place.** **AO1** – Knowledge and understanding of 'insider' perspectives on place. Knowledge and understanding of how qualitative and other data can represent place. **AO2** – Applies knowledge to assess whether only qualitative sources can represent 'insider' perspectives on place. Mark scheme **Level 3 (7–9 marks)** **AO1** – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout. **AO2** – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Assessment is detailed and well supported with appropriate evidence. **Level 2 (4–6 marks)** **AO1** – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy. **AO2** – Applies clear knowledge and understanding appropriately. Connections and relationships between different aspects of study are evident with some relevance. Assessment is evident and supported with clear and appropriate evidence. **Level 1 (1–3 marks)** **AO1** – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change. This offers limited relevance with inaccuracy. **AO2** – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Assessment is basic and supported with limited appropriate evidence. **Notes for answers** The question requires an assessment of whether only qualitative sources can represent 'insider' perspectives on place. **AO1** • Knowledge and understanding of 'insider' and 'outsider' perspectives on place. • Knowledge and understanding of the use of qualitative and quantitative sources to represent place. • Knowledge and understanding of the concept of place and importance of place in human experience. • Knowledge and understanding of local and / or distant place studied.	**9** **AO1 = 4** **AO2 = 5**

		AO2 • Personal accounts obtained by interviews and questionnaires can help to establish if someone feels they ‘belong’ in a place as they document human experience of a place. • Qualitative sources such as text, poetry, film, art and photos may represent what it is like to be ‘inside’ that place and experience the place as an ‘insider’. However, not everyone shares this view and it may not provide a complete picture of ‘insider’ perspectives in a place. • Quantitative data such as census data and IMD can be mapped and help identify spatial patterns of groups who have economic, social and cultural power and those who are more likely to experience a greater sense of belonging and an ‘insider’ perspective. • Place surveys often use a combination of qualitative and quantitative tools to gauge people’s perception of place and sense of belonging or being an ‘insider’. • ‘Qualitative’ maps may identify particular areas or places where people feel like an ‘insider’ or an ‘outsider’. These may be more useful that maps which just show quantitative socio-economic data about a place. • More quantifiable data from questionnaire surveys may give a wider view of ‘insider’ perspectives within a place than qualitative data from interviews. And also, interviews may be coded and subjected to quantitative analysis to gain an ‘insider’ perspective. • A conclusion should make a judgement about to what extent only qualitative data can represent an ‘insider’ perspective. Some may agree that qualitative data sources are more likely to be useful for representing ‘insider’ perspectives. Some may argue that quantitative sources can also be useful for this purpose. Others may take a more balanced view and suggest that both qualitative and quantitative sources can represent ‘insider’ perspectives on place. Credit any other valid evaluation.	

01	6	**Increased connections between people and places mean that places should no longer be categorised as 'near' and 'far'. To what extent do you agree?** **AO1 –** Knowledge and understanding of how places can be categorised as 'near' and 'far'. Knowledge and understanding of the impacts of connections on people and places. **AO2 –** Assessment of to what extent an increase in connections between people and places has made the categorisation of places into 'near' and 'far' less relevant. Notes for answers This question makes connections between different parts of the specification content on Changing Places, specifically the linking of how places are categorised into 'near' and 'far and how connections between people and places may impact on this. Responses should focus on evaluating the importance of how far increased connections between people and places may affect the relevance of the categories of 'near' and 'far' places. **AO1** Knowledge and understanding of: • categories of place: near places and far places • the concept of place in relation to the local place within which students live or study and then at least one further contrasting place and encompassing local, regional, national, international and global scales • the ways in which the following: relationships and connections, meaning and representation, affect continuity and change in the nature of places and our understanding of place • the ways in which students' own lives and those of others are affected by continuity and change in the nature of places and our understanding of place • how humans perceive, engage with and form attachments to places • a local place study exploring the developing character of a place local to the home or study centre • a contrasting place study exploring the developing character of a contrasting and distant place. **AO2** • Overall, the intensification and acceleration of connections through flows of trade, money, people and information has led to a 'shrinking world' making the concept of 'near' and 'far' questionable. • Increased connections via the internet may lead to people feeling closely connected to places that are physically far away of which they have no lived experience. The categories of 'media' and 'experienced' places may be more relevant than 'near' and 'far'. • Increased international migration and greater cultural diversity of places also means that people of different ethnicities may feel 'near' to their original homeland even if they no longer live there. For example, British 'expat' enclaves are common in UAE.	**20** **AO1 = 10** **AO2 = 10**

		• The categories of 'near' and 'far' may break down with the increased speed of modern transport connections. If 'far' places are distant to the place where people live, improved transport connections mean that 'far' places can be reached more easily and experienced more often either for work or leisure. However, some places remain geographically remote and difficult to get to or experience so can still be categorised as 'far' places. Some communities may be geographically 'near' but remain relatively isolated and perceived by people as 'far' places. • The presence of global companies, brands and products in 'far' places may make places seem more homogenised and therefore difficult to categorise as 'near' and 'far'. For example, the idea of 'clone' towns in contrast to 'border' towns. However, most places are likely to be shaped by a combination of local and distant connections and categories of 'near' and 'far' may help with an understanding of how a place has been shaped over time by changing connections both local and global. • Far places can often be associated with 'other' and increased connections may not have altered this as these 'far' places may be physically close. • The global pandemic may have made the categories of 'near' and 'far' once again more relevant to the study of place. • In the past, when places were not so well-connected, people may have developed stronger place attachments as they spent more of their lived experience and had more connections within a particular locality. However, many people do still have strong attachments to a 'local' place or may feel excluded from this for many reasons and the categories of 'near' and 'far' may still be very relevant to how people experience and perceive places. • A conclusion should make a judgement about the extent to which connections between people and places mean that the categorisation of places into 'near' and 'far' is still relevant in the study of changing places. Some may suggest that other ways of categorising places may now be more relevant. Any view is acceptable, as long as it is supported with reasoned argument and may also include illustrative examples and evidence. Credit any other valid assessment.	

Marking grid for Question 01.6

Level/ Mark Range	Criteria/Descriptor
Level 4 (16–20 marks)	• Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question (AO2). • Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout (AO2). • Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout (AO1). • Full and accurate knowledge and understanding of key concepts and processes throughout (AO1). • Detailed awareness of scale and temporal change which is well integrated where appropriate (AO1).
Level 3 (11–15 marks)	• Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question (AO2). • Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding (AO2). • Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Generally clear and relevant knowledge and understanding of place(s) and environments (AO1). • Generally clear and accurate knowledge and understanding of key concepts and processes (AO1). • Generally clear awareness of scale and temporal change which is integrated where appropriate (AO1).
Level 2 (6–10 marks)	• Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question (AO2). • Some partially relevant analysis and evaluation in the application of knowledge and understanding (AO2). • Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Some relevant knowledge and understanding of place(s) and environments which is partially relevant (AO1). • Some knowledge and understanding of key concepts, processes and interactions and change (AO1). • Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies (AO1).
Level 1 (1–5 marks)	• Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question (AO2). • Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence (AO2). • Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2). • Very limited relevant knowledge and understanding of place(s) and environments (AO1). • Isolated knowledge and understanding of key concepts and processes. • Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies (AO1).
Level 0 (0 marks)	• Nothing worthy of credit.

Section B

Qu	Part	Marking guidance	Total marks
02	1	**Suggest one reason why background reading is useful preparation for any fieldwork investigation.** <u>Point marked</u> Award one mark for a valid suggestion and one mark for development (d). For example: <u>Notes for answers</u> This will involve learned knowledge and understanding of the specification. • Background reading will help the student to link the investigation to relevant theory or key concepts (1) and so establish aims or set out a hypothesis (1d). • Background reading will enable the student to gain a broad overview of the topic to be investigated (1) and could help to steer the investigation away from a 'wrong direction'(1d) or identify 'gaps' which the student could develop in their investigation (1d). • Background reading may provide secondary data which is relevant to the investigation (1). This could provide a basis for later comparison with primary data collected (1d) • Background reading could help the student develop a wider knowledge of the area where the investigation will take place (1) and any key or specific issues relevant to this place that might influence results (1d) • Background reading could help the student to identify potential hazards at the location (1) and enable a risk assessment to be put in place (1d) or identify what equipment might be need to be taken (1d). The Notes for answers are not exhaustive. Credit any valid points.	**2** **AO1 = 2**
02	2	**Suggest how Figure 2 could be used to help devise a sampling strategy for a human geography fieldwork investigation.** <u>Point Marked</u> Award one mark for a valid suggestion of one named sampling strategy (1) **and / or** one mark for specific use of Figure 2 in relation to a sampling strategy (1). Award additional marks for each new and relevant development of its application (d). <u>Notes for answers</u> • Particular land use zones could be identified, for example, industrial area, green space etc.(1) that could be used for planning a stratified sample (1).	**4** **AO3 = 4**

		• Systematic line samples/transects (1) can be identified along main roads (1d) and points plotted to assess feasibility and/or risks (1d). • A grid could be placed over the town (1) to generate a systematic area sample (1d) **or** a stratified or random sampling strategy (1d). • It may provide a less 'cluttered' view of the area for investigation than an OS map which makes it easier to plot sampling points (1) for systematic sampling (1) or to demark areas for stratified sampling (1). • The aerial photograph could be overlaid onto census areas in order to triangulate the areas for sampling with secondary data (1). Reserve full marks for a clear link to aspects/features seen on Figure 2. Credit any other reasonable suggestions related to fieldwork in relation to the aerial photograph and sampling.	

02	3	**Suggest how geo-located data collected by a student could be presented on Figure 2.** Point Marked Award one mark for any valid suggestion of specific data that can be geo-located (1) (e.g., pie charts, graphs). Award a mark for suggesting how it can be presented on Figure 2. Notes for answers • Geo-located data can be located on the aerial photograph at sampling points (1) and presented as proportional bars or circles (1). • Qualitative data such as field notes, observations or photographs (1) can be tagged and/or presented at sampling points or within sampled areas (1). • Data could be plotted at sampling points and an isoline map constructed (1) to show spatial patterns (1). • Map overlays could be added (1) to show, for example, census output areas or physical features (1). • A choropleth map could be overlaid (1) onto the aerial photograph using any area-based data (1). Credit other relevant suggestions.	**2** **AO3 = 2**

03	1	**The student decided to compare the number of houses sold by calculating the median, a measure of central tendency.** **Explain why he chose to calculate the median number of houses sold and not the mean.** <u>Point marked</u> • The median is a good measure of the average value when the data include exceptionally high or low values (1) because these have little influence on the outcome (1d) and this data has some exceptionally high values (1). • Unlike the mean, the median value doesn't depend on all the values in the dataset (1). Consequently, when some of the values are more extreme, the effect on the median is smaller (1d). • When you have a skewed distribution, the median is a better measure of central tendency than the mean (1). Credit any other valid points.	**2** **AO3=2**

03	2	**Suggest how the student could present this secondary data to aid his analysis.** <u>Point marked</u> Award one mark for a valid suggestion of one named presentation method (1). Award additional marks for each further explanation or stage in the sequence of how the method is presented (1d) (e.g., labelled axes etc.). Marks should also be awarded for suggesting how the named method will aid in the student's analysis of the data. Reserve full marks for suggesting how the method would aid analysis. <u>Notes for answers</u> • A line graph (1) showing number of crimes for each year in a different colour (1d) would enable a comparison of the pattern of crime for each area over time (1). • For each year the student could plot 'houses sold' as a bar graph and 'crime data' as a line graph (1) with a dual axis (1d). This would enable the student to see if there is any relationship between crime and sold houses (1). • A scattergraph (1) could be used to identify any relationship between crime and sold houses (1d) and comparisons made between the two areas (1d) • The student could use a comparative bar chart (1) to analyse if there had been a similar pattern of house sales for each year in the 2 areas (1). • Dispersion graphs (1) for the two years would look at the spread of housing or crime data (1d) to indicate if there was a consistent pattern (1) and how similar or different the patterns were across the two areas (1d). Credit any other valid points.	**4** **AO3 = 4**

03	3	**Suggest why the student's secondary data on crime may be more reliable than the house sale data.** Point marked • The crime data is collected, compiled, checked and verified by a government department (police website) so it could be more accurate than house sale data which is compiled by a commercial company (1). • The house sale data is reported on this website but it is not the original source of the data which is the Land Registry (1). • The housing property site is reporting this data for a purpose with a particular audience in mind, rather than as government statistics (1). Credit any other valid points.	**2** **AO3 = 2**

03	4	**Using Figures 3, 4, 6, 7 and 8, evaluate the student's plan for primary data collection.** **AO3 –** Use a range of information and techniques to synthesise and draw aspects of the study together. Evaluation of the plan for primary data collection. Mark scheme **Level 3 (7–9 marks)** Detailed use of information about the enquiry which is used to evaluate planned primary research. Detailed evidence of drawing together different elements of the study in order to support the response. **Level 2 (4–6 marks)** Clear use of information about the enquiry which is used to evaluate planned primary research. Clear evidence of drawing together different elements of the study in order to support the response. **Level 1 (1–3 marks)** Basic use of information about the enquiry which is used to evaluate planned primary research. Basic evidence of drawing together different elements of the study in order to support the response. Notes for answers • The survey is a simple method for collecting data that would be easy to use in the field, would enable a comparison between the two areas and would enable quantitative and qualitative analysis. • There are close links to theory with a variety of aspects of place character considered. • Subjective judgements for each category on the survey tool are open to individual interpretation and value-judgements. A more detailed descriptor of each place characteristic would add clarity to any assessment in the field. • A scoring system for each category may enable a more detailed quantitative analysis and the possibility of statistical testing. • Other quantifiable data could be collected such as housing quality, environmental quality or noise recordings. • There is a clear sampling strategy but a wider geographical sample of each area would be more representative of place character across the whole area rather than the areas close to the key roads as this may bias the data. Random or systematic area sampling or two traverse line samples might be suggested as alternative sampling strategies. • A pilot survey could enable some of these issues to be resolved. • The number of samples to be collected is low which would affect the analysis stage and a larger sample would have enabled the hypothesis to be tested more reliably. • There is no suggestion of repeat testing or testing at different times of the year/day to increase reliability of data collected. • Some might question the decision to not collect other types of data that would collect people's opinions, such as interview or questionnaire data.	**9** **AO3 = 9**

		• There may also be a suggestion that the plan addresses this hypothesis but would not help to meet the broader aim of investigating if the new housing development has changed the overall character of the village or how much the new development alone had contributed towards changing place characteristics. • There is easy access to sites but there needed to be a more thorough risk assessment particularly considering the proximity to main roads. • Overall, the student's proposed data collection methods are feasible and would enable him to collect primary data that is relevant to his hypothesis. However, there are clearly some changes which could be made which may lead to a more detailed analysis in relation to the hypothesis and broader aims of the investigation. Credit any other valid approach.	

04	1	**The student decided to compare the discharge by calculating the median, a measure of central tendency. Explain why she chose to calculate the median discharge and not the mean.** Point marked • The median is a good measure of the average value when the data include exceptionally high or low values (1) because these have little influence on the outcome (1d) and this data has some exceptionally high values (1). • Unlike the mean, the median value doesn't depend on all the values in the dataset (1). Consequently, when some of the values are more extreme, the effect on the median is smaller (1d). • When you have a skewed distribution, the median is a better measure of central tendency than the mean (1). Credit any other valid points.	**2** **AO3=2**

04	2	**Suggest ways the student could present this secondary data to aid her analysis.** Point marked Award one mark for a valid suggestion of one named presentation method (1). Award additional marks for each further explanation or stage in the sequence of how the method is presented (1d) (e.g., labelled axes etc.). Marks should also be awarded for suggesting how the named method will aid in the student's analysis of the data. Reserve full marks for suggesting how the method would aid analysis. Notes for answers • A line graph (1) showing discharge for each year in a different colour (1d) would enable a comparison of the pattern of discharge before and after the housing development (1). • For each year the student could have a single graph which plots rainfall for each day as a bar graph and discharge as a line graph (1) with a dual axis (1d). This would enable the student to see if there have been any significant changes in the way the river responded to a storm event (1). • A scattergraph (1) could be used to identify any relationship between rainfall and discharge (1d) and comparisons made between the two areas (1d) • The student could use a comparative bar chart (1) to analyse if there had been a similar pattern of rainfall for September in these 2 years (1). • Dispersion graphs (1) for the two years would look at the spread of discharge data (1d) and identify if there were more extreme high values (1) indicating more likelihood of flooding (1d). Credit any other valid points.	**4** **AO3 = 4**

04	3	**Suggest why the student's secondary data on discharge may be more reliable than the rainfall data.** Point marked • The discharge data is collected, compiled and verified by a government department (Environment Agency) so it is likely to be more accurate than rainfall data which is collected by amateurs using a variety of recording equipment (1). • It is not known what equipment has been used to collect the rainfall data whereas the discharge data comes from a 'gauging station' (1). • The discharge data is more likely to have been checked before being published on a government website (1). • The gauging stations are likely to be set up to ensure accuracy in the recording of data whereas an amateur data collector may be less careful about the siting of equipment to ensure data accuracy (1). • Credit appropriate comments about the validity of comparing the total rainfall and mean discharge. Credit any other valid points.	**2** **AO3 = 2**

04	4	**Using Figures 9, 10, 12 and 13, evaluate the student's plan for primary data collection.** **AO3 –** Use a range of information and techniques to synthesise and draw aspects of the study together. Evaluation of the plan for primary data collection. Mark scheme **Level 3 (7–9 marks)** Detailed use of information about the enquiry which is used to evaluate the planned primary research. Detailed evidence of drawing together different elements of the study in order to support the response. **Level 2 (4–6 marks)** Clear use of information about the enquiry which is used to evaluate planned primary research. Clear evidence of drawing together different elements of the study in order to support the response. **Level 1 (1–3 marks)** Basic use of information about the enquiry which is used to evaluate planned primary research. Basic evidence of drawing together different elements of the study in order to support the response. Notes for answers • The student has designed a simple method for collecting the run-off samples after a rainfall event that would be possible to construct in the field. • The reliability and accuracy of data was considered by attempting to limit the impact of direct precipitation and collecting run-off at six sites. However, the student did not consider that the measurements would need to be taken at the same time after the storm event to accurately compare the run-off totals and the need to ensure that there was no water collected before the storm event. • There is also a lack of clarity about how much rainfall constituted a storm event and would trigger the student to collect the samples. • The number of samples the student is proposing to collect is low (six for each of the sites). This may make statistical testing and analysis problematic. Some may argue that a larger sample would have enabled the hypothesis to be tested more reliably. • In addition, there is no suggestion of repeat testing or testing at different times of the year to increase reliability of data collected. However, some statistical tests, such as Mann-Whitney could be carried out to identify if there was a significant difference in run-off between the two areas. Some may also question the student's decision to collect data after only one storm event and may suggest the need for repeat data. • Some might question the student's decision not to collect discharge measurement from the stream as they have alluded to the link between run-off and stream discharge and this may be seen as a missed opportunity to make a link as well to the secondary data. • There may also be a suggestion that the plan addresses this hypothesis but would not help to meet the broader aim of investigating if the new housing development has led to a rapid increase in	**9** **AO3 = 9**

		discharge after a storm event. This data collection could not establish a causal link that is suggested in the aims and objectives. • The student has a clear sampling strategy and has justified this. Some may suggest a random sampling strategy might be more representative of run-off across the whole area or that the student should have adhered the line sample more closely to the 20 m contour line to control for the variable of gradient. • The student has ensured that there is easy access to the site. However, she has not discussed the need for permission from the local landowner. It is also not clear when the data collection plots would be set up and how the student would ensure they remained intact until after the storm event. • Ethical issues would also need to be considered such as damage to the ecosystem as the guttering needs to be placed in the ground. • The student does have a health and safety plan. However, this needed to be a more thorough risk assessment particularly considering the proximity to water. • Overall, the student’s proposed data collection methods are feasible and would enable her to collect primary data that is relevant to her hypothesis. However, there are clearly some changes which could be made which may lead to a more reliable data collection and more detailed analysis in relation to the hypothesis and broader aims of the investigation. Ethical issues and risk assessments also need to be more fully considered. Credit any other valid approach.	