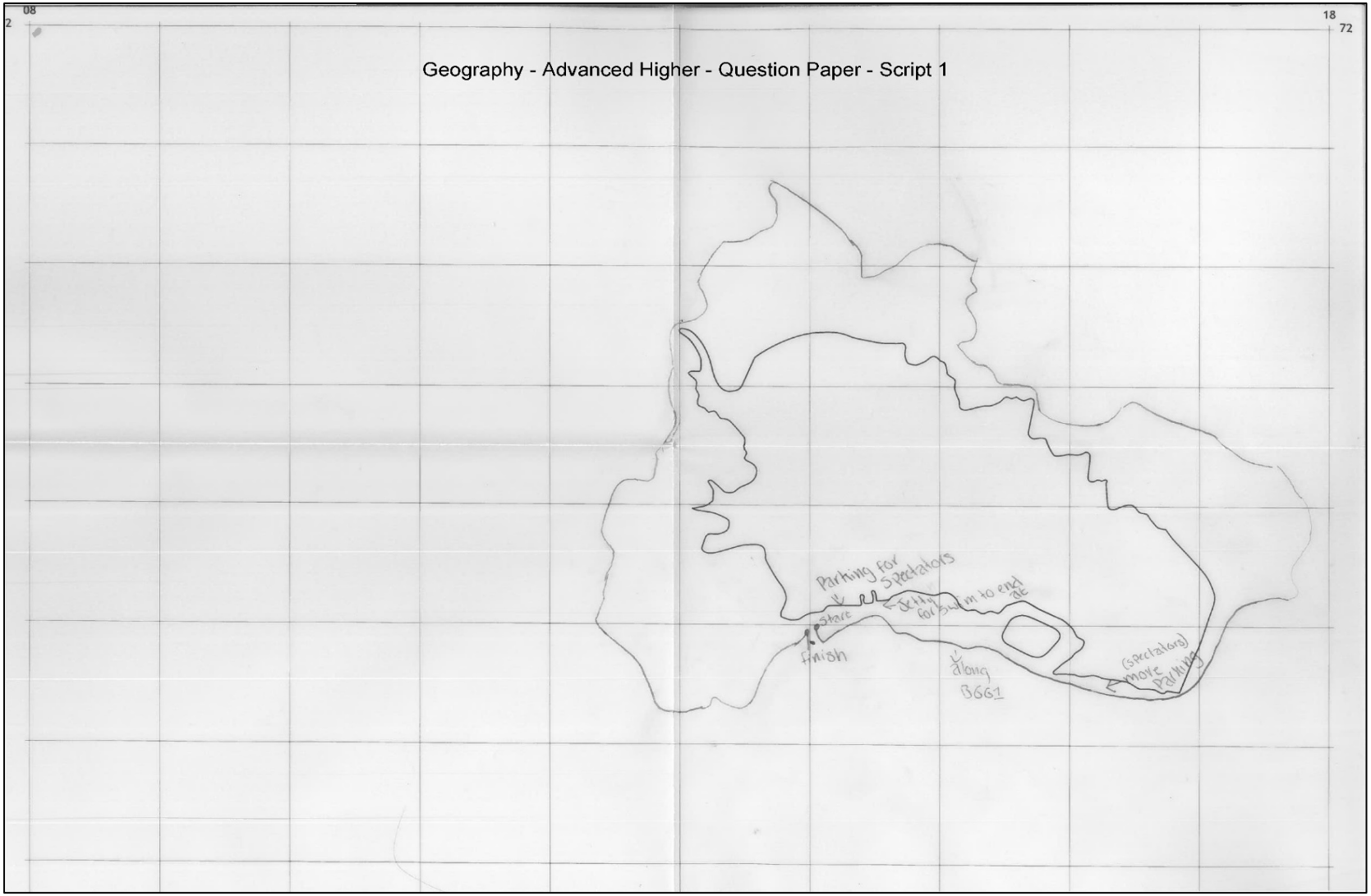
Candidate 1 evidence



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1 Question 1

a

ii) The route I have chosen is mainly based near the water. ~~Basted~~ the route starts & finishes in 140670. I chose this area to both start & finish the race because there is nearby parking 142672 as well as 162665, for spectators etc, & the jetty for swimmers to exit at perhaps 145673

- There is also a nearby picnic site that the audience could stop at for food or even food vans etc to park up at 141672
- There is also open space that can be used as to add extra parking, bike storage, more food vans & portapottys 137669 &
- right where the race begings is open 140664

may be toilets in ferry for spectators

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aii Allowing no destruction has to be made
- The route chosen has areas off & on road, the begining starts along the B661 before heading into hilly off road 178675 then follows a footpath, into some forestry paths this allows the race to have lots of different textures/surfaces on/off road
- A disadvantage may be that roads/paths may need to be shut or partially closed off. (B661 & footpaths 175684)
- As well as needed to ask permission from land owners perhaps at 177675
- Some of the woodland areas 135664 may not be fit for 200+ cyclists so some construction may be need to underway.
- some of the areas nearby the water 140670 may get marshy & hard to build (food stalls) on or cycle on, especially if its raining.
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iii - A positive Socio economic Impact may be that a mass number of tourists 200+ Athletes & their family/friends (Spectators) will bring lots of tourists & customers to perry allowing local businesses increased sales (bringing hundreds of tourists)

- Another is that the event may encourage any improvements, such as adding benches to the town, local toilets, fixing potholes etc Improving perry for the living of locals & may also encourage more tourists to the area
- local Hotels in perry & Great Staughton will benefit as most people will need a place to stay, boosting them economicly & potentially giving them good reviews increasing tourism & customers to the hotels.
- The event may also encourage more water sports to the waters 148675 adding more amenities for locals.
- the race will also bring ~~[illegible]~~ ~~time~~ a job Opportunity to locals such as setting up the race etc.

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iii) The ~~cycle~~ cycle hire at 164 682 may also benefit as more people may be encouraged to cycle after the event

1

B- The dam/reservoir may impact the noise pollution for the locals in perry as well as light pollution

- flooded land means farmers crops would struggle to survive, that with them having less land means farmers lose yield = lose money = people lose = jobs = less food/yield
- other flooded areas may be buisinesses in town (perry) meaning temporary closures as well as pricey damage fees, these temporary buisiness closures may leave a bad name on perry & steer tourism away meaning less customers

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2. a) i) and ii)

The width of the river would be measure by holding a tape measure from bank to bank. This must be held tightly and straight across.

This width should the by divided by 10 to give the sample points across the river. This is systematic sampling and should give data that represents that whole section well.

At each sample point a depth reading can be taken. This would be with a meter stick being held still and touching the river bed/ stones on the river bed.

To gather data on velocity,

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3 readings should be taken at points calculated to be evenly spaced. Results can be collected using a flotation device and stopwatch or a flow meter.

The tape measure must be held tightly in the exact same position for the duration of the investigation of the site. This ensures the data at each sample point was taken where it should have been.

The meterstick should be wooden, not metal, to ensure it doesn't bend. You must stand down-stream of the meterstick as to not impact the reading.

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For velocity readings, you must stand as out of the way as possible to avoid impacting results.

If using a flotation device to measure velocity it may get stuck in which case it must be noted, or the measurement is re-taken.

If the river isn't moving and a result of 0 is collected, it must be some-what accounted for in calculations as it implys a fast river.

Taking repeats of readings then calculating averages makes the results more reliable as potential errors or miss-readings have less impact.

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2. b) The potential for a student to slip while in the river could be lowered with suitable footwear with adaquate grip.

Students may get very cold and so should dress appropsiatly and take breaks to warm up if required.

A first aid kit should be brought on this type of trip and someone with suitable trainning should be present.

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3a(i) Transects ~~connect one~~ are a line connecting one area to another. They are suitable because they offer a ~~wide~~ general overview of an area and the possible changes within. Transects are an effective way to measure change by using systematic intervals e.g. every 300m. They can be superimposed onto a base map. Transects are unsuitable because it is only a small area covered compared to the ~~the~~ size of the city. They appear to be non-biased however, their location could miss out large factors in the rest of the area. Important factors could coincidentally be missed because the line is so small. A belt transect is wider and covers more area ~~as~~ than a regular transect which could be used instead as a better means of gathering and presenting information.

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3a(ii) The highest level of noise pollution of 85 dB is found in the centre of the CBD. This is because the ~~nearest~~ highest number of vehicles are found here, which produce noise from exhausts, engines and also beeping horns.

Site 4 is on a motorway which explains the abrupt increase in noise levels (82 dB.) This is because car's engines are loudest here as they are travelling fast.

The sites following 4 all offer similar high number decreasing this is because the noise from the motorway is still heard from these places but the further away you go, the quieter the noise becomes.

Site 9 offers a low noise level of 45dB This is because 0 vehicles were found here and diagram 1 shows an open space suggesting a school playground (as it is situated beside an Academy.)

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Similarly, site 13 shows the lowest noise level of all the sites (43 dB). This is also because there were no vehicles counted, a low number of pedestrians and it appears to also be situated on a Park where it is quiet and not busy. The data could be collected on a week day when most kids were at school and adults at work which would explain the quiet park.

Site 16 shows a high noise level (70dB) and high vehicle count (89). This is because is is beside a main road but also a residential area, which would also explain the 34 pedestrians.

Trains are loud when they pass but their lines are quiet otherwise. The data could've been taken when no trains passed

We would expect site 18 to have the lowest noise pollution because it is furthest from the bustling CBD however it is 3rd lowest with 53 dB. This could be because it is mostly houses nearby and no major roads. and there is also a train line and Station beside site 18.

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b(i) There is no relationship between noise levels and distance from the CBD.

(ii) The result of −0.65 lies between −1 and 0. This means there is a negative relationship between distance from CBD and noise levels.
I.e. As the distance from the CBD increases, the noise levels decrease.

0.65 ~~lies between~~ is greater than 0.63 (the significance value for 99%) which means the results of the Spearman's Rank Correlation Coefficient are 99% significant.
This means we must reject the null hypothesis.

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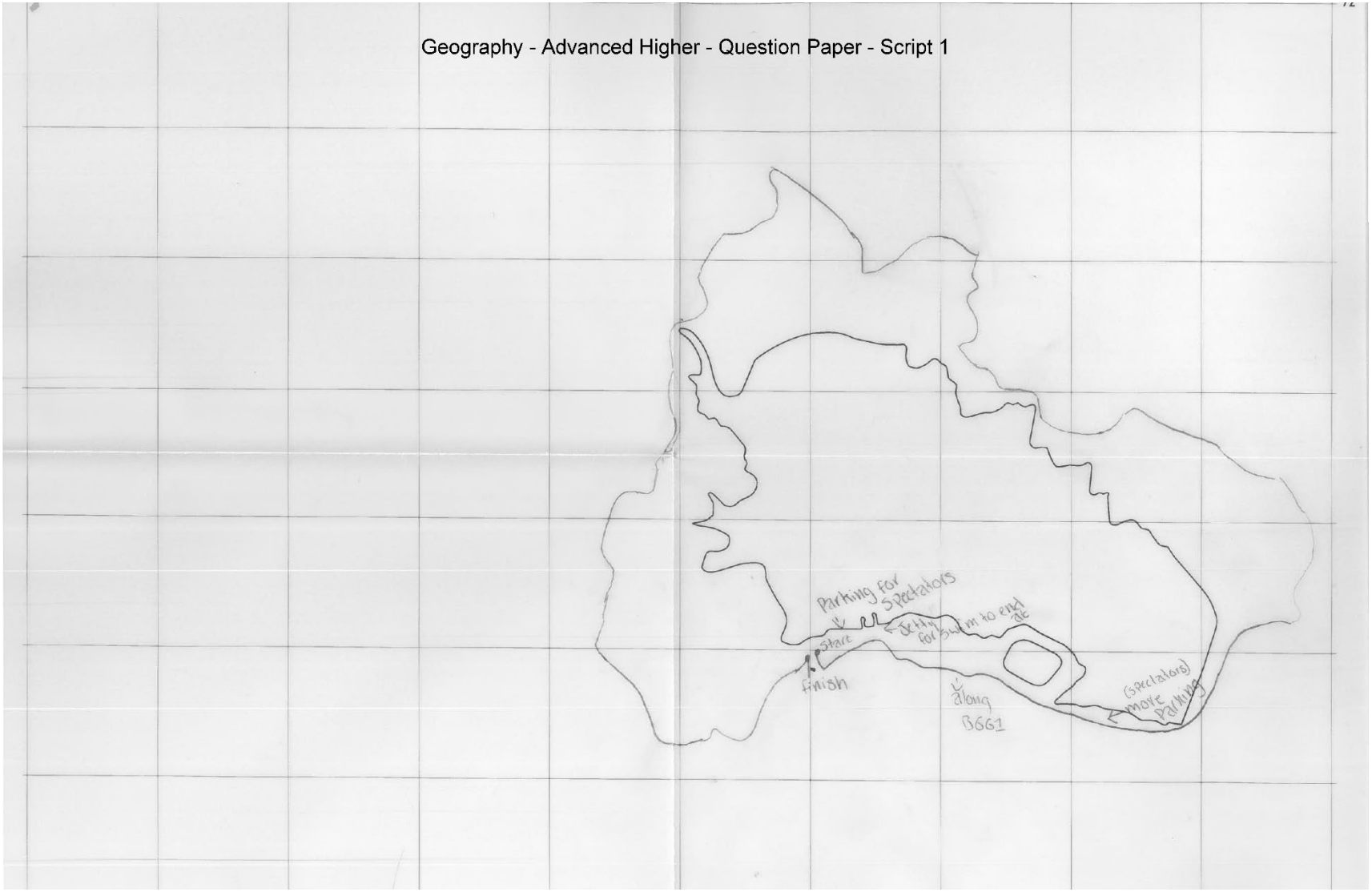
(iii) Spearman's Rank Correlation Coefficient is a way to determine if ~~their~~ there is a relationship between two variables, using ranking values.
It is suitable because it is easier to complete than Pearson's Product Moment Correlation Coefficient because it uses ranking values (rather than actual values) which are ~~as~~ easier to work with. Therefore it is less time consuming.

Spearman's is unsuitable because it offers less accurate results than Pearson's due to it using ranks instead of actual values.

Candidate 2 evidence



Title of atlas used in examination	Collins Student Atlas (8th edition)

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1(a)	(ii) The route begins at the jetty at 145 673, where competitors could more easily exit the water after the swim section of the race. Bikes for the athletes could also be stored in this area because there is plenty of open space, as it is just outside of the Perry where there are more densely packed buildings. There is a car park very nearby (less than 500m away, at 142 671 where competitors and spectators could park before the race. This would allow people to park close, without getting in the way of, for example, the bike storage area. There is also a picnic site next to the car park where spectators could site, as they watch the swim section of the race, or the competitors could eat here before the	

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race. There are a number more carparks and picnic sites throughout the course where spectators could sit and watch the race, like at 162 665. This would also allow greater distribution of spectators, so there is not so much congestion in Perry at the start point of the race. The race ends very close to the start point in Perry, because this will be more enjoyable for spectators who will get to see the start and end of the cycle. It also means competitors don't need to travel far to get back to their families / cars / equipment, ~~and a~~ There is a ~~re~~ access to food at the public house at 148 668 where spectators and competitors can eat. This ~~bbbld~~ business will likely also have a toilet for spectators and competitors, as there are no other public toilets marked nearby on the map.
The route goes through a nature reserve at 131 679, which will make the route scenic and enjoyable for competitors. This section is also on a traffic free cycle

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route, meaning the terrain will be useful for bikes, and less roads will need closed for the event. There are a cycle hire and cycle trail at 163 682, where the route passed, which ~~to~~ shows the area is already popular for cycling so will be perfect for the race. The B661 will provide access to the start point of the cycle route for spectators and competitors who have travelled by car. This road connects to the B660 north and B645 south, meaning the 200 competitors could ~~travel~~ ~~natio~~ travel from areas like London and ~~Birmingham~~.

The route ends, on a flat road (the B661) this will allow competitors to have a sprint finish. This ~~a~~ finish line is also in Perry, so there will be plenty of local spectators to cheer on competitors as they finish the race.

The route is mostly ~~flat~~ fairly flat, but there are a few challenging sections like through Diddington Wood at 175 665, where the contour lines show

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the land is hilly. There are a range of terrains to make the route more interesting and challenging for competitors. Cycling around the Reservoir will provide scenic views for competitors and spectators. As there are many footpaths linking to the site (eg. from Littless Wood) spectators will be able to safely and easily access the side of the route to cheer competitors on.

1.
(a)(iii) The event will bring more visitors to the local area around Grafham Water who will contribute to the local economy by spending money in local restaurants like in Perry and in Ellington at 159 719. ~~People~~ The campsite at 158 695 may also receive more visitors which will increase their profit. Whilst ~~people~~ visitors are in the area they may choose to stay longer and enjoy the nature scenery

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for example by fishing at 145 673, or visiting the nature reserve at Littless Wood. This will increase people's appreciation of the area, boosting the local area's popularity and ~~people~~ visitors may choose to return. Local farmers could take the opportunity to sell their produce to visitors in stalls at the race start line which could support their livelihoods. Local people could be hired to help staff the event, for example young people could be paid to help with water stations and checkpoints along the route. This would contribute ~~to the local economy. The race could~~ encourage local people either to get fit to compete in the race, or use the routes more often which would boost local physical and possibly mental health due to the positive impacts of spending time outside. The event could create a stronger sense of community in the area as locals join together to organise and support the event and its competitors.

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It may reduce stigma ~~around~~ the area currently has due to the prison cuts at 152 660, encouraging people to visit the area in the future and spend money in the area.

11b. By flooding the area many natural habitats would have been destroyed ~~AH~~. This could negatively impact local animal and plant species and have a devastating effect on the local biodiversity. The removal of many local farms would decrease economic activity in the area. Since the reservoir was constructed to supply drinking water it may be an unsuitable habitat for many aquatic species because it is man made and therefore unnatural. This could mean the biodiversity lost would not be replaced. The electric cable pilon running over the previous area of land where the reservoir was built would have had to be destroyed and re-routed. This would have been expensive and could have caused financial disruption for local businesses whilst it was sorted.

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~~There is~~ The dam may mean areas downstream have been deprived of water, removing habitats for fish and insects. ~~#~~ Diddington Brook may have provided an area for fishing which when removed would remove profit from ~~fishm~~ being sold in the area. Farmers being displaced ~~so~~ could cause depopulation in the area, ~~so~~ meaning businesses may have less staff and may have had to close down, damaging the local economy. The decrease in farms and farming land could mean local restaurants have to ~~search further afield for fresh~~ produce, which would be detrimental ~~for their income, and therefore the~~ local economy. Disrupting the nature balance in the area would disrupt the local ecosystem ~~Constra~~, and some species may no longer be able to survive. The construction of the dam and reservoir likely involved concrete and cement ~~which can ca~~ and other chemicals which could pollute the

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surrounding environment and harm animals and plants. More energy will be needed to process and clean water which will negatively impact the environment ~~and air quality by~~ are by releasing CO_2. The construction could cause increased air pollution due to the use of concrete and large vehicles, producing toxic fumes. The land is less economically viable after flooding, as it cannot be used for farming.

2a:(i) To measure the width of the river the students should use a measuring tape and one person should stand either side of the river on its banks. The width of the river should be taken as a measurement in meters from the very edge of the bank on one side to the very edge of the bank of the other. The measuring tape should be held at the surface of the river and not at an angle to ensure accurate and reliable measurements. The wetted perimeter of the river should also be accounted for to ensure reliability and could be measured

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by laying a metal chain across the river bed so that it reaches from one bank to the other. The chain should then be marked and the measurement taken by laying it next to a measuring tape.

To measure the velocity of the river the students should measure both the surface and ~~can~~ below the surface flow. A digital flow meter can be used to obtain a value. The flow meter should be placed in the centre of the river, underwater at a set distance below the surface each time to ensure validity (eg. 30cm). The flow meter ~~should face eg~~ up the river (against the flow) and the value for the velocity ~~should be read and recorded~~. This should be carried out at a number of locations along the River Kym to improve reliability by gathering more data. For surface flow ~~a light object should be dropp~~ 2 ranging poles / meter sticks should be placed in the water a set distance apart (eg. 5metres). One person should stand at the

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first pole, and another 5m downstream at the 2nd. They should both be at the centre of the river. To ~~not~~ increase reliability, the metre stick should be placed so the thin side is against the river flow, so it doesn't disrupt the flow. A light object like a tennis ball ~~shou~~ or ping pong ball should be dropped at the 1st pole/stick and the time measured using a stopwatch to see how long it takes to reach the 2nd pole/stick. Human error may decrease ~~the~~ reliability when the stopwatch is started and stopped, so the journey could be videoed and analysed to get a more accurate, reliable reading. It's also important for the students to consider how their bodies may disrupt the river's flow, so they should stand to the side. This test should be carried out at least 3 times to increase reliability and get an average. The students should measure depth across the whole river width at a number of locations to get a good idea of

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its depth and to increase reliability (an average could be calculated). Depth should be measured at set intervals along the river, using the width from the ~~measur-~~ing tape measure and dividing it for example by 10. This would allow intervals for depth data to be created systematically, & reducing bias and therefore improving reliability. They should use a measuring stick (eg meter stick) to measure from the surface of the river down to the river bed. With all this data it would be useful to ~~pre~~prepare a table ~~for data collection and recording values.~~ ~~Meas~~

To calculate the discharge they should do width x depth x velocity. They could use mean values from data collection across the river to improve reliability. Using at least 10 sample sites along the river will provide better, more reliable data. The students could choose these sample sites using systematic sampling, for example every 100m

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along the river, or 200m. If the students already have knowledge of different areas across the river with varying depths and widths, stratified sampling may be more suitable to ensure data is representative and reliable. All data collection should be ~~carried out~~ repeated at least 3 times to ensure reliability. Measurements should be recorded accurately to appropriate sig. fig.s.

b. A risk assessment could be carried out before the fieldwork to ensure risks have been considered and can be minimised. Avoiding very deep or fast flowing areas of river will protect students, as powerful water carries the risk of drowning. It may be more suitable to carry out field work during summer when the water is warmer, so less potential risk for ~~a~~ cold water shock, and river levels may be lower. The students should

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go out in a large group so that there are plenty of people to provide help if needed. Staying close to roads / footpaths like the B645 means emergency vehicles / help can access the students if a problem arises. They should tell a trusted adult of their location, and keep them updated throughout the fieldwork. They could go with a teacher / an expert who knows what they're doing. Wear appropriate footwear to avoid eg. ankle sprains. Check weather before going out in case of dangerous storms.

3. (a)(i) Transects are very useful for showing changes across an area. Being able to draw them onto a base map means data can be compared directly to land uses. Using a transect to gather data means a large area of land can be covered, but more quickly. Systematic sampling pairs well with

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the transect because it means data is collected at regular intervals along the transect. The ~~stu~~ Officers can see if there are changes in noise levels moving from the CBD to the suburbs. Data from the area of the transect close to the CBD can be directly compared to data near ~~the~~ suburbs. It is easy to follow a transect when carrying out data collection, and removes the difficulty of having to chose sample locations. It gives and overview of trends across a geographical area. Multiple ~~pi~~ sources of data can be taken at each point on the transect, making it quicker and less labour intensive than doing each individually. ~~A bi~~ It ~~will be~~ may be difficult to travel between each point on the transect. If the transect goes into dangerous / inaccessible areas data woon't be able to be collected for these areas (eg ~~over~~ a point could land on a major road). When displaying the data the transect can be ~~easily~~ annotated. Field sketches / photographs

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can be used for extra evidence along the transect. If the transect is too long it will be very time consuming to gather data. A transect can be combined with a cross section to make links between geographical height and slope and changes in data collected. Using a transect means the whole area doesn't need to be surveyed, but a sufficient amount of data to show changes is collected, reducing time and labour. This will also reduce the cost of hiring people to carry out the survey.

3(a)(ii) Moving from the CBD to the suburbs there is generally a decrease in traffic based noise, because number of vehicles decreases from 156 at site 1 to 0 at site 17. This will reduce the noise of cars running as well as horns honking. There will also be less need for pedestrian crossings which make a noise, because moving away from the CBD there are less busy roads, and less pedestrians. The greatest noise levels are directly in the city centre. This could be because areas of the city centre have

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~~been pedestrianised~~ the moor traffic. Large vehicles like lorries are unlikely to travel into the city centre, as they will use less busy roads (eg. ring roads) to travel around the city. This could ~~make~~ mean some suburban roads still have traffic. Areas like site 8 may have more noise pollution because of business around the hospital. Moving out to the suburbs there is more open space, where there is likely to be less noise pollution and more gentle sounds of nature. The increase in noise levels at site 14 could be because it is right next to a road junction, so there are more vehicles. There is also a school nearby which could be loud due to groups of children if the data was collected at the ~~end~~ of a school day. Site 4 is loud because it is next to a large road (A57(M)) ~~(dual carriage way)~~ motorway where there are lots of vehicles (121 in 15 minutes). At site ~~18~~ 17 the land use is mostly residential, which will decrease noise pollution ~~be~~ because people will be

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in their homes, and not so much on the streets. This is proven by the fact that there were no cars and only 12 people measured in 15 minutes. Site 11 is slightly less noisy. This could be because there is a mosque nearby, which is likely to be built in a calm peaceful area, and respected by quietness. Fast vehicles on the A57 motorway will cause more noise at site 4 than slower moving cars on smaller roads like next to site 9 (82 dB vs 45 dB). There is a railway line next to site 3 which could explain why even though there are less cars (34) at the site it is still noisy (69 dB), compared to further out. Site 2 is ~~likely to be more noisy~~ 23 dB noisier than site 18 further away from the CBD because it is right next to a busy road and there are more popular attractions in the CBD like the Exhibition Centre which people will drive to to see. As open space increases moving away from the CBD, noise decreases because open space like parks don't generate as much ~~or~~ noise.

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3b. (i) There is no relationship between noise levels and distance from the CBD.
There is no correlation between distance from the CBD and noise levels.

(ii) Since the ~~val~~ calculated value of 0.65 is greater than the critical value of 0.63 at 99% significance level, the null hypothesis should be rejected and it can be stated with 99% certainty that results did not occur by chance. There is a fairly strong negative correlation between distance from the CBD and noise levels because the value of -0.63 is closer to -1 than 0, and -1 is perfect negative correlation. Therefore the alternative hypothesis should be accepted with 99% certainty. It can be stated with 99% certainty that there is a negative correlation between distance from the CBD and noise levels. This result should be compared to a scatter graph of the data to confirm

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the result, and further research should still be carried out. The alternative hypothesis should be accepted with 99% certainty.

3b(ii) Spearman's Rank is useful for relationships that may be non-linear like noise levels and distance from the CBD because it ranks data. Ranking data means Spearman's is less affected by extreme values. However ranking data also makes Spearman's less ~~act~~ accurate. Spearman's is ~~easier and quicker to calculate than~~ Pearson's Product Moment Correlation (PPMC). However Spearman's isn't as strong a ~~stra~~ statistical test as PPMC, because it uses ranked data. The calculated Spearman's value can be compared to critical values from a significance table which is useful because it can be concluded with 95% or 99% certainty if results did or didn't happen by

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chance. Since the calculated value is positive or negative it gives an indication of where there is a positive or negative correlation between noise levels and distance from CBD. Spearman's Rank is suitable for this data because there are 2 variables being compared. There are also more than 10 data points which increases the accuracy of the statistical test. Spearman's Rank allows more accurate conclusions to be made about data than simply looking at the values, and the calculated value can be compared for different areas. The value can also be compared to a scattergraph of the data to confirm the result. Linear regression can also be carried out along side Spearman's to reinforce its reliability to and visually express the correlation. Spearman's rank is relatively quick and easy to calculate.

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3(a) (ii) There is a gradual decrease in noise from the CBD to the suburbs due to changes in landuse. Noise levels are highest where there are many cars. This could be because data was recorded during rush hour, which would amplify the effect of traffic noise on results. Site 18 could increase in noise levels compared to site 17 due to the railway line and road nearby. The university is quieter than other areas because it is more pedestrianised campus. Site 9 has lower noise pollution than other sites because there are a number of schools, so the environment should be quieter to aid academic focus. The athletic ground may cause an increase in noise from traffic as people will drive there to train. Increased noise pollution could be because of sudden noises like an ambulance outside the hospital. Increasing traffic levels increases noise pollution.

(Additional sheet responses)

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
1d	Could encourage people to buy houses and move to the area as they experience the pleasant nature in the area. This would support the local community housing market and economy.	
3(a)(i)	Transects can clearly show changes in relation to spatial geography, allowing 2 important variables to be compared. Easy to set up, and follow and can be plotted onto a base map.	
3(a)(ii)	The motorway will have more through-traffic coming through the city, causing increased noise pollution compared to the suburbs where there are less major roads.	