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Draw a cross through the box (☒) if you have NOT written in this booklet

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NZQA

Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 3 Geography 2024

91426 Demonstrate understanding of how interacting natural processes shape a New Zealand geographic environment

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of how interacting natural processes shape a New Zealand geographic environment.	Demonstrate in-depth understanding of how interacting natural processes shape a New Zealand geographic environment.	Demonstrate comprehensive understanding of how interacting natural processes shape a New Zealand geographic environment.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

There is ONE question to answer in this booklet.

If you need more room for your answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

Do not write in the margins (////). This area will be cut off when the booklet is marked.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

Merit

TOTAL 05

QUESTION

How do **interacting** natural processes create **spatial** OR **temporal** variations in a New Zealand geographic environment?

In your response:

- name a New Zealand geographic environment and the interacting natural processes that shape it
- construct a supporting annotated map or diagram in the space provided on page 3
- integrate comprehensive supporting case study evidence
- you may integrate other annotated maps and diagrams to support your answer.

You may use the space below to plan your response.

PLANNING

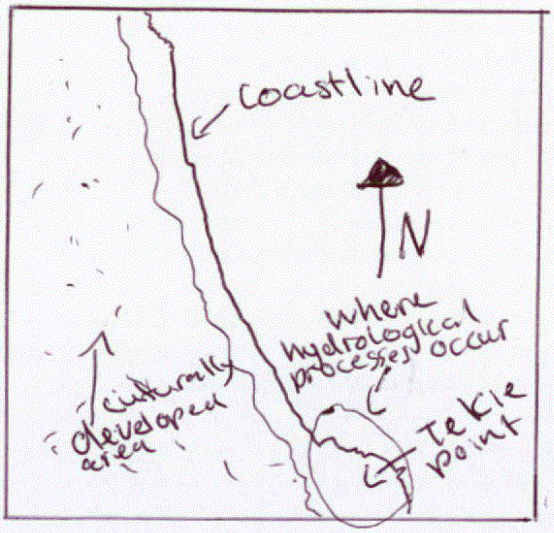
Chosen (✔) variation: ☑ Spatial ☐ Temporal

MAP/DIAGRAM

Title: Hydrological processes interacting with Te Kie point

Te Kie point is made of the Waitemata series mudstone and sandstone. The mudstone layers are easily erodable by hydrological processes such as abrasion, corrosion, hydraulic action and water layer weathering (abrasion shown below). As mudstone erodes, gaps are left under sandstone to fall due to gravity (quarrying)

Ornahea Beach



Omaha Beach, or the Omaha Coastal Environment (OCE) is located 75 km North from Auckland in the Hauraki Gulf. The OCE stretches from Ti point in the North to Te Kie point in the South, inbetween is the Mangawhitiri spit. Hydrological, Climatological and Geomorphological processes have shaped and created variations between the cliffs, beach size and dune size in the OCE.

There is variations between the cliffs in the OCE being Te Kie point and Ti Point. Both headlands were created 15-25 million years ago through tectonic processes causing uplift of land producing 50m tall Ti Point and 20-50m tall Te Kie point. Ti Point interacted with volcanic processes meaning Olivine Basalt was spread over Ti Point making the sediment very difficult to erode. However, located in the South of the OCE, (Ti Point in North) is Te Kie point which did not interact with volcanic processes during the uplift. Therefore as shown in the diagram, Te Kie point is made of the Waitemata series, sandstone and mudstone with the mudstone being easily erodable by various hydrological processes. These are abrasion where rocks are thrown at Te Kie point by waves with high energy gained in the fetch. The waves have enough energy, rocks hit Te Kie point dislodging sediment. Hydraulic action also erodes Te Kie point with high energy waves hitting Te Kie

point with power but also saturating the ~~rock~~ sediment. This process of hydraulic action interacts with water layer weathering, rocks become ~~sta~~ saturated by are dried by solar radiation and aeolian action of wind. As rocks dry and heat, they ~~ex~~ panel dislodging from Te Kie point. Corrosion as interacts with hydraulic action as the water causes a chemical breakdown of rock causing them to lose structure and fall. All these processes target the mudstone layers mostly, causing sandstone which is more solid to fall from gravity from the gaps of mudstone left below, as shown in diagram. Overtime, these processes erode Te Kie point by 2cm in recession yearly. This varies from Ti point in the North which does not recede nearly as much.

There is variations between the beach width in the OCE in the North and South ends of the beach. This is primarily controlled by hydrological deposition, ~~where~~ where waves deposit sand onto the Beach. For this to occur, tide must be 2.5m above the low tide line. Then waves reach along the coastline due to wave refraction allowing waves to approach ~~a~~ areas to approach the bay at 90° but bend according to ~~the~~ the curvature of the bay. Then, the waves must be spilling waves with low energy and height in order to make the initial force of the swash wave greater than the backwash. The waves are generally spilling at Omaha because of the 3-4° slope existing the

Swash wave and not the backwash, a steeper slope would help backwash. The efficiency of this process between the North and South ends of the beach is determined by headland coverage. In the South, the beach is protected by Te Kie point absorbing the energy of oncoming action from south east winds. This reduces the northward LSD (movement of sediments in the tides) ~~secondary~~ meaning less movement of sediment along the ocean and more movement of sediment in land. This means lots of sediment directly from Te Kie point end up in the Southern end of the beach as sediments from hydrological processes explained previously ~~from~~ force rocks into the wave for wave action to bring them ashore via hydrological deposition. This makes ~~the end~~ the Southern end 50m wide. In the north there is no headland coverage meaning the oncoming processes are more powerful ~~possibly~~ making the LSD much faster via the North. This means that more sediment is moved along the coast rather than deposited on the beach reducing the width of the North end of the beach to be 20m. The Northern end of the beach also is much further away from Te Kie point resulting in the remnant of sediment arriving to be spread accross the rest of the beach. There is also variation in sand grain size being 0.33mm in the South and 0.17mm in the north due to attrition. As sediment travels to LSD, pieces smash into each

reducing their size. Sediment in South don't travel very far, so there is less attrition, Sediments in the North have travelled far to be there so have had a greater interaction with attrition. Therefore there is variations between ~~sand~~ the beach width in the north and south due to hydrological deposition (linked to LSD speeds (LSD is Long Shore Drift)

There is also variations between the sand dune size as the strength ~~of~~ and speed of wind differs controlling aeolian processes. As the requirements for hydrological deposition are met such as 2.5m higher than low tide and spilling waves, solar radiation dries the deposited sand as the tide retreats. Once it sand has dried saltation and sand creep can occur. ~~Saltation~~ Saltation requires wind speeds of 5m/s to pick up grain sands to fall due to gravity striking the next grain. At 4.5m/s wind speeds Sand creep occurs rolling sand grains along the surface of the beach. They sand moves to the back of the beach and is trapped in clumps by vegetation succession of plants like Wire Wire grass. These processes create variations between the north and south of the OCE because the southern end is protected from ~~aeolian processes~~ South east winds by Te Kie point reducing wind speeds. This negatively impacts saltation and sand creep as the required winds speed are less frequently reached so less saltation and sand creep occur. This has lead to less sand being trapped

Extra space if required.
Write the question number(s) if applicable.

QUESTION NUMBER

In Wie Wie grass and dunes being 2-4m. In the North there is less wind coverage so wind speed requirements are more frequently hit for more saltation and sand creep making dunes 3-4m.

Overall, variations are present in the OCE between Tī point and Te Kie point, beachs width and dune sizes in the Northern and Southern ends of the beach due to interacting hydrological, climatological and geomorphological processes shaping these features of the OCE.

91426

Merit

Subject: Geography

Standard: 91426

Total score: 05

Grade score	Marker commentary
M5	The written response is detailed, and one unannotated diagram is provided. Detailed supporting case study specific evidence is included in the written response. Reasons for variations and interactions between processes are analysed in detail. Further annotations of diagrams, as well as a greater integration and insightful analysis of evidence, would be needed to achieve Excellence.