DEPARTMENT OF ENVIRONMENT
CAYMAN ISLANDS GOVERNMENT

Coastal Works Review

Pierce Holdings (Cayman) Ltd-Proposed Dredging for Fill for an Off-site Development and an Inland Navigational Channel

Block: 20C **Parcel:** 175 and 176

Ref: DOE/CWK/460

PREPARED FOR: MINISTRY OF SUSTAINABILITY & CLIMATE RESILIENCY

March 23, 2023

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Project Proposal

The Applicant – Pierce Holdings (Cayman Ltd) - is seeking permission to dredge an access channel with an area of 112,473 square feet (2.6 acres), measuring approximately 100 feet wide by 1,127.73 feet long with a water depth of 12 feet as shown in Figure 1, which will connect to an inland canal leading to an existing man-made lake. The application for the inland canal has been submitted to the Department of Planning (P23-0037), though no commercial development has been proposed in that application. The application being considered by the Department of Planning consists solely of a man-made lake and no buildings such as a marina, commercial facility or dock etc.

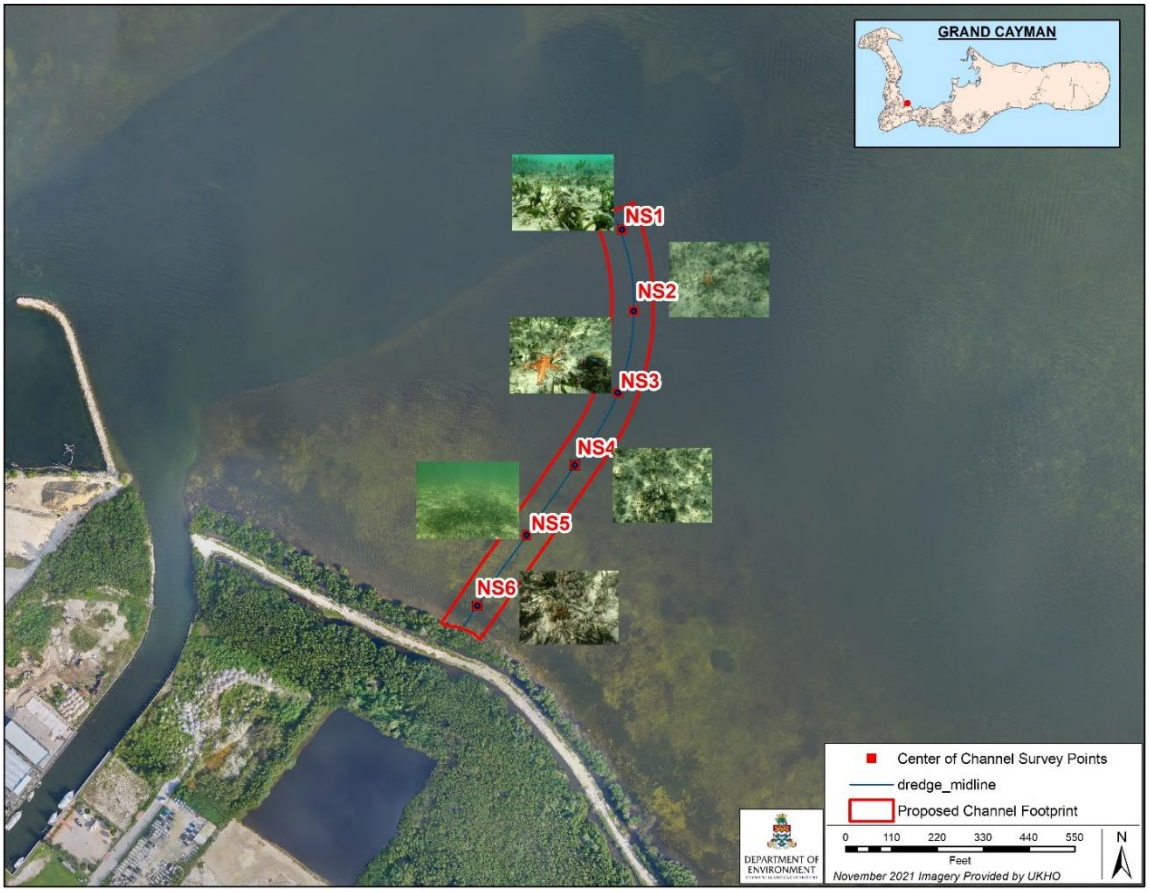


Figure 1: United Kingdom Hydrographic Office's 2021 aerial imagery showing the proposed channel outlined in red (Source: UKHO, 2021).

To create the channel, a temporary 20 ft. wide causeway using 2 ft. to 3 ft. boulders will be constructed to provide access to the seabed. The causeway on Crown property is not depicted on any plans, and therefore it is not known where the causeway is intended to be located though it has been assumed that it will be located entirely within the direct footprint of the dredging activity. The causeway and the seabed will subsequently be removed using a mechanical excavator and material will be transported to shore. Where rock is encountered, a hydraulic jackhammer shall be used to facilitate the excavation. The sides of the channel are proposed to have a slope ratio of 1:1.

The applicant has estimated that the total volume of dredged material to be removed is 27,670 cubic yards. The applicant, through supporting documents, the application form and written confirmation from their agent, has indicated that dredge material is to be relocated off-site to Block 8A Parcels 86 & 96 to fill a mangrove wetland site for the development of a senior living facility to be built to +12 ft. MSL.

According to the applicant's application form, the works will affect approximately 112,473 square feet (2.6 acres) of Crown property and includes the removal of 47,140 square feet (1.08 acres) of hard bottom and 65,333 square feet (1.5 acres) of seagrass.

Rationale for Dredging

The rationale for the dredging application is inconsistently presented but generally includes two purposes. The first is to provide fill for an off-site senior living facility in West Bay and the second is to provide access to an inland commercial marina.

The application form states that the project name is 'Greta's Grotto Senior Living Facility'. The proposed activity is described as 'excavation to form a navigational channel off 20C/176 and inland canal to an existing man-made lake. The fill is to be used for a proposed senior living facility.' On the application form, to describe the purpose and the need of the facility, it is stated that the need is to 'create a new waterway for commercial use. Excavated fill will be used for a proposed retirement facility (subject to a separate planning application)'. Under proposed benefits, it states that it will provide fill for the proposed senior living, which will 'ensure the commercial viability of the proposed facility'.

The cover letter states that the application was submitted in the interest of Greta's Grotto Senior Living Facility which is on Block 8A Parcels 86 and 96 and provided information about the forecasted fill requirements (26,728 cubic yards) for the facility's site. It also outlines that it is important that the Greta Grotto site be elevated to at least 12 ft. above mean sea level 'in order to protect its residents from life-threatening evacuations during extreme weather events such as higher storm surges created by more intense hurricanes and long term sea level rise directly linked to climate change'

The application form also mentions that the waterway will be constructed for commercial use but continuously highlights that the proposed activity, the need and the justification for the navigational channel is for the relocation of fill off-site to a proposed retirement facility.

The planning application did not include any commercial development on Block 20C Parcel 175 (the existing man-made lake) and there is no space on this site for any commercial development, as it has been entirely excavated to the parcel boundaries on either side and the planning application did not include filling in any part of the lake to make space for a commercial development, except for the causeway to

facilitate dredging and off-site removal of material. Block 20C Parcel 176 is designated as Mangrove Buffer Zone which can only be developed under exceptional circumstances under the Development and Planning Regulations. No exceptional circumstances have been specifically outlined in the application.

Therefore, given that the applicant states that the fill is to be removed off-site for a separate development, the Coastal Works Review herein has also taken that into account.

In summary, the purpose of the proposed dredging is to create:

- A navigational channel to access Block 20C Parcel 176,
- A connection for the man-made lake at Block 20C Parcel 276, and
- Access to cheaper fill to develop a low-lying mangrove wetland site located at Block 8A Parcels 86 and 96 in West Bay.

Environmental Overview & Impacts

The environmental impacts of the proposed dredging project are categorised into the following:

- Direct and indirect impacts of dredging on the seabed;
- Direct impacts on coastal mangroves (from both Coastal Works and Planning applications);
- Water quality impacts from the inland canal/commercial basin (Planning application);
- Impacts on inland mangroves (destination of fill); and
- Principle of dredging in the North Sound.

Direct and Indirect Impacts of Dredging on the Seabed

Water Quality Impacts

The environmental consequences of dredging have long been documented and poor water quality arising from past dredging projects remains evident in the North Sound. The primary direct and irreversible impact of dredging is the absolute physical removal and permanent loss of the ecologically productive bottom substrate; however, dredging has also been known to change water circulation, tidal flow, and water levels, as well as allowing seawater inundation of land and augmenting the likelihood of creating anoxic (oxygen deprived) waters on the sea floor of the borrow pits and canals.

Dredging operations generate transient plumes of sediment as the material is being removed, regardless of the type of equipment used, although some are less impactful than others. The water column will be temporarily affected by turbidity during active dredging, reducing water quality in the short term i.e. couple of months and in the medium to long-term. Once dredging is complete remaining silts and clays at the bottom are susceptible to re-suspension from propeller movement and natural perturbations if bottom habitat such as seagrasses do not quickly recolonise the dredged areas. The turbidity impacts can potentially impact fish and other marine species, as well as smothering nearby seagrass beds and corals. These impacts can significantly alter the presence, distribution and abundance of species that currently colonise the area, performing vital ecological functions, while also changing the nearshore's ability to protect the coastline.

The applicant has indicated the use of silt screens in their submission. However, from the DoE's previous experience, it is **not possible** to eliminate the impacts of the sediment plumes generated during a dredging project of this scale through the use of silt screens even when installed correctly, particularly when the sediments contain a high percentage of silty fines as is typical of the nearshore sediments in the North Sound. Figures 2 and 3 show the impacts of a dredging project approved by a previous Cabinet administration. This project used a similar dredging methodology of a causeway constructed of marl fill with two layers of silt screens (which were installed correctly) around the dredged area. The dredging still produced substantial sedimentation impacting the marine environment (See Figures 2 and 3 below).

Figure 2: Drone imagery from 10 April 2018 of the Heritage Holdings access channel site sent to DoE from the public. Please note that the permittees had securely installed two layers of silt screens.

Figure 3: Drone imagery from 10 April 2018 of the Heritage Holdings access channel site sent to DoE from the public. Please note that the permittees had securely installed the silt screens.

Loss of Benthic Habitat

The habitat in the footprint of the proposed channel consists of dense seagrass beds and consolidated coarse sediments colonised with marine algae, sea grasses, sponges, and coral colonies (see Figures 4-9). It is a valuable marine habitat that has remained relatively undisturbed, and, following historical dredging projects, represents a now scarce habitat for the North Sound which typically support a variety of fauna living in sediments, invertebrate and fish communities. This habitat type, referred to as transitional habitat, has been greatly reduced and impacted by previous dredging activity off the western perimeter of North Sound making the remaining habitats significantly important. The removal of these areas and their ecosystems by the proposed dredging of seabed will cause severe adverse environmental effects. The dredging of this channel will directly remove 1.5 acres of healthy seagrass beds alone and 1.08 acres of hard bottom transitional habitat.

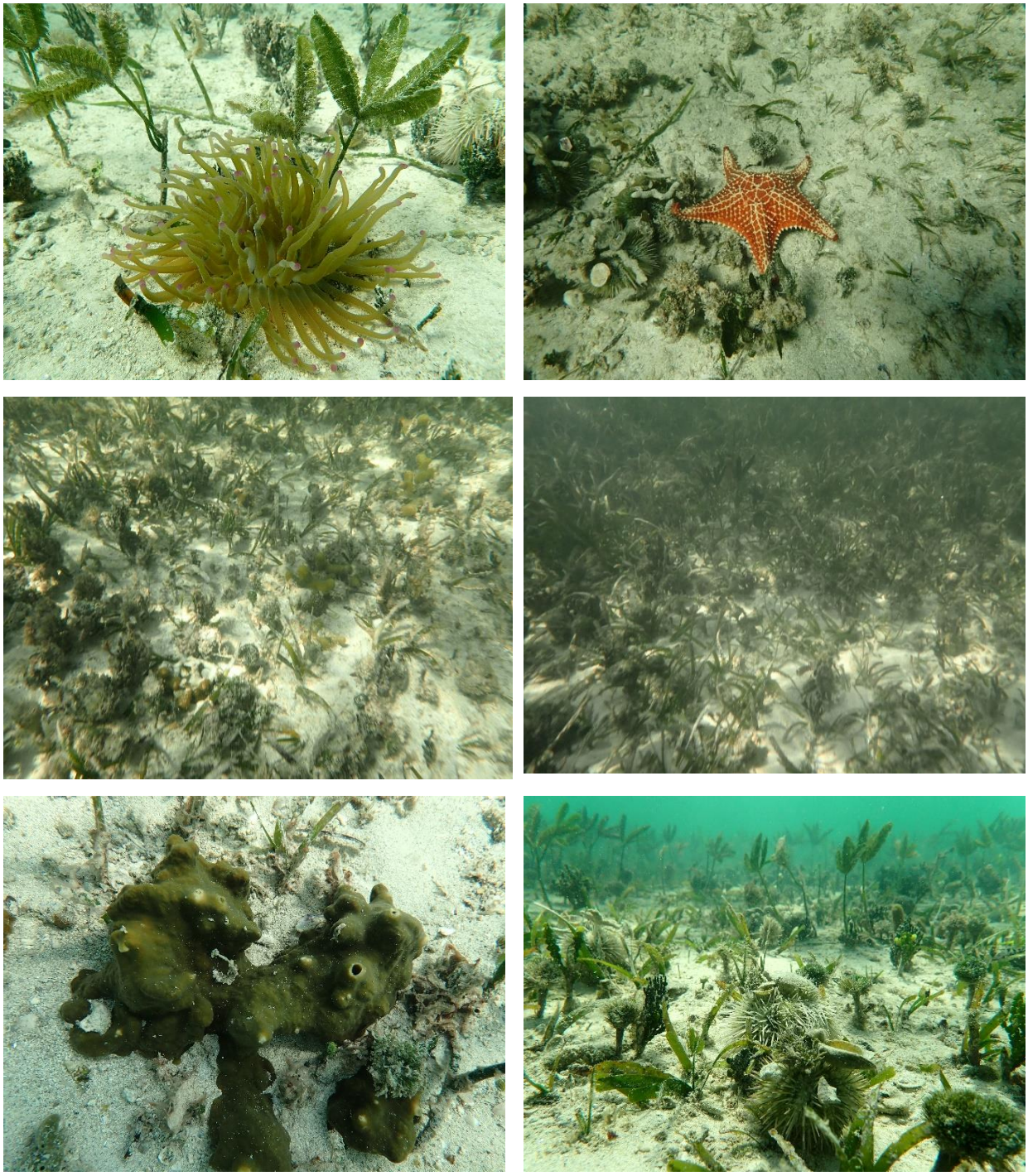
One of the vital functions of seagrass beds is to provide habitat. In this area, they complement the surrounding mangroves, providing a healthy ecosystem for marine life and aiding in the protection and stabilization of the coastline. Seagrass and algal beds provide food and shelter for many marine species at different stages of their life cycles and thus function as nursery areas for commercially important fish species. The habitat function of seagrasses increases in value when they are connected to adjacent

mangrove or coral reef ecosystems since seagrass beds act as transitional habitats and pathways for the juveniles of species that spend their adult phases in the adjacent ecosystems.

Seagrasses also provide many other ecosystem benefits and it is acknowledged to be one of the most valuable and vulnerable ecosystems.[1] Given the climate change predictions for the region, which include rising temperatures, sea-level rise and increased intensity of storm events (including storm surge), another beneficial function of seagrass beds is that they provide flood reduction and reduce erosion from wave action aiding in shore protection, particularly along beaches and shallow areas. Although often overlooked in comparison to mangroves, seagrasses are also nutrient sinks, buffering or filtering nutrient and chemical inputs to the marine environment aiding in water quality. The deposition and stabilisation of sediments provided by seagrasses assist other important adjacent marine ecosystems such as coral reefs.

It is generally scientifically accepted that the coastal ecosystems of mangroves, seagrass meadows and tidal marshes mitigate climate change by sequestering carbon dioxide (CO_2) from the atmosphere and oceans at significantly higher rates, per unit area, than terrestrial forests. Therefore, seagrass communities are also valuable because they contribute to our islands' natural capital, serving as important carbon sinks. Carbon accumulates in seagrasses over time and is stored almost entirely in the marine sediments incorporated in the root systems. This means that the direct removal of seagrass results in carbon being released back into the atmosphere. Although in-depth local studies have not been undertaken, the Blue Carbon Initiative (a global program working to mitigate climate change through the restoration and sustainable use of coastal and marine ecosystems) acknowledges that '*although seagrasses account for less than 0.2% of the world's oceans, they sequester approximately 10% of the carbon buried in ocean sediment annually (27.4Tg of carbon per year)*. Per hectare, seagrasses can store up to twice as much carbon than terrestrial forests*. The global seagrass ecosystem organic carbon pool could be as high as 19.9 billion metric tons*.*'[2]

[1] United Nations Environment Programme (2020) *The State of Nearshore Marine Habitats in the Wider Caribbean*. Available at: https://wedocs.unep.org/20.500.11822/36352 (Accessed: 30 August 2022)
[2] The Blue Carbon Initiative (2019) *About Blue Carbon.* Available at: https://www.thebluecarboninitiative.org/about (Accessed: 30 August 2022).



Figures 4-9: DoE site visit photos from 20 January 2023 showing marine life including sea stars, sea anemones, encrusting sponges, sea urchins and seagrass within the dredge footprint.

Direct Impacts on Coastal Mangroves

In order to construct the causeway and ultimately the channel, mangroves on shore will be directly impacted in order to access the site with equipment. In addition, a planning application has been submitted to excavate mangroves as part of the inland canal element. Mangroves are Schedule 1, Part 2 Protected Species under the National Conservation Act (2013) with an adopted Species Conservation Plan.

Figure 10 shows the healthy mangroves that will need to be removed to facilitate the proposed channel and subsequent canal entrance. The removal of these mangroves results in a direct loss of nursery habitat for marine life and the loss of ecosystem services mangroves provide. The mangroves in this area are also located within a Mangrove Buffer Zone as designated in the 1997 Development Plan. The Development and Planning Regulations (2022) state that all forms of development **shall be prohibited** except in exceptional circumstances, and only where equivalent storm protection is provided by some other means and it can be demonstrated to the Central Planning Authority that the ecological role of the peripheral mangroves will not be substantially adversely affected by the proposed development and that there is no alternative for safe access.

In the DoE's opinion, there is a clear alternative which provides safe access through the adjacent parcel, without excavating and compromising the existing intact Mangrove Buffer Zone. This involves negotiating access through one parcel located to the west (Block 20C Parcel 133).

Coastal mangroves are structurally diverse ecosystems that support high biodiversity. Numerous marine species, including fish and shrimp, use mangroves as nurseries during early life stages. An accumulation of bacteria and mangrove tree detritus provides a source of food for juvenile species and, hidden amongst mangrove roots, juveniles are more likely to avoid predation from larger animals. When the mangrove refuge is no longer required, these animals move out, through adjacent seagrass beds and into the adjoining reefs or the open ocean. It is for this reason that mangroves are critically important in assisting with the replenishment of some of the sea's fish stock, especially the rainbow parrot fish (near threatened on the ICUN Red List of Threatened Species) and the goliath grouper (critically endangered on the ICUN Red List).

Mangroves also assist with maintaining good water quality and clarity by providing a natural buffer that helps to intercept surface water runoff, filter pollutants and trap sediments originating from land. In addition, mangroves help to prevent soil erosion by binding the substrate. Together with other marine resources such as coral reefs and seagrass beds, mangroves also aid in protecting the shoreline from damage in storms by providing a wave break.

Another important function of mangrove habitats is that they are extremely effective at sequestering carbon from the atmosphere and serve as carbon sinks. The removal of the mangrove habitat reduces the island's natural carbon sequestration potential and releases captured carbon back into the atmosphere.

Figure 10: Healthy mangroves remain along the coast of Block 20C Parcel 176 which complement the seagrass beds in the area (Source: DoE site visit, 31 August 2022).

Water Quality Impacts from the Inland Lake

A planning application has also been submitted to connect the offshore channel to the existing man-made lake. The Planning application and the Coastal Works Permit are directly linked and neither will be viable without each aspect of the development.

When the connection is made between the existing excavated pond and the North Sound, there will be water quality impacts from the mixing of the stagnant inland waters in the existing excavation with the water in the North Sound. The depth of the water in the inland pond, which was excavated around 2008, is unknown, and is not depicted on the application or the drawings. The lack of circulation and presence of fine materials or sediment settled on the bottom of the lake is likely preventing the reestablishment viable ecosystem functions. If the canal is to be connected to the North Sound, poor-quality water will likely be released into the North Sound impacting nearshore sensitive marine resources. There may be continual resuspension events and/or a long-term impacts.

Therefore, the DoE is concerned that opening up the existing man-made lake into the North Sound will contribute to water quality issues due to the continued discharge of water from the canal and man-made lake.

During the planning application for the historical lake (P08-0261), the Water Authority had similar concerns. The planning permission has an existing condition which states, “There shall be no connection of the lake to the sea.” The Quarry Permit issued by the Water Authority on 23 September 2013 also has

the condition that there shall be no connection of the lake to the sea. With respect to the current planning application, the Water Authority has expressed concerns and in their memorandum states, *"Connection of a 20ft deep basin via a 14 ft. deep canal to a 12 ft. deep channel into the North Sound under prevailing easterly wind conditions will create a situation where debris will accumulate and stagnate in the 20 ft. deep basin, resulting in water quality problems."*

Impacts on Inland Mangroves

The application states the fill is required for the development of an off-site location at Block 8A Parcels 86 and 96 (Figure 11). The site is occupied by mangrove wetland and is low-lying. It is located near Barkers, east of Papagallo Pond. It is stated that the fill is needed in order to make the project financially viable.

If development is not financially viable without the destruction of 2.6 acres of publicly-owned natural and undisturbed seabed, then the project should not be considered financially viable irrespective. The precedent and environmental effects of permitting a developer to destroy the marine environment in order to access cheaper fill to move off-site are unjustifiable. The developer should instead procure market-rate fill from licensed quarries or an alternative viable site for the retirement home. Allowing a private developer to develop a quarry on public property (the Crown seabed) undermines the licensed quarrying activities that fall under the Development and Planning Regulations, the land-use planning system and the government's duty to preserve the marine environment for the entire Cayman Islands. The severe environmental impacts are further compounded by the fact that the proposed development site is a mangrove wetland. If this proposed dredging project is granted a Coastal Works Permit, there will be the loss of over 6 acres of mangrove habitat at the development site and the loss of 2.6 acres of sensitive publicly-owned natural and undisturbed seabed.

The precedent of this project is unacceptable, as there are no exceptional circumstances which signal the need to grant this developer access to cheaper fill through impacts to the marine environment. It would likely open the door to all other developers who would like to find cost-savings for materials and look to the publicly-owned natural resources for their own profit.

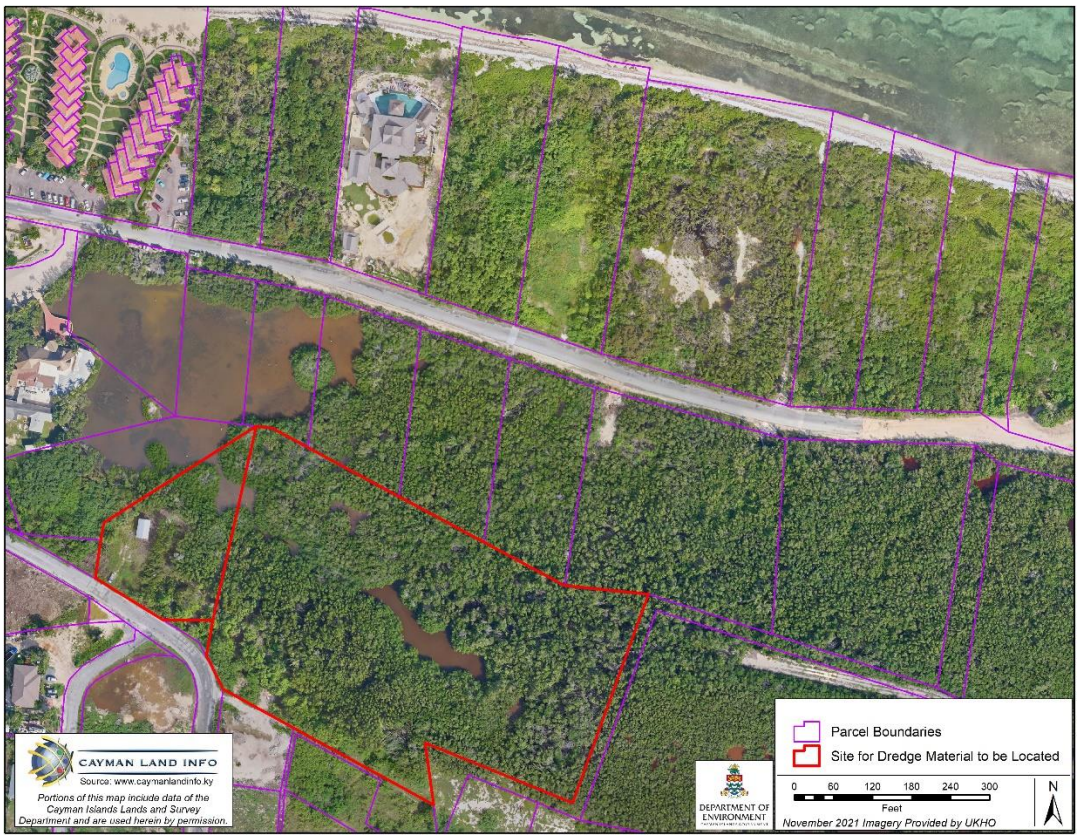


Figure 11: UKHO's 2021 aerial imagery showing the site of where the dredge material will be taken to for fill on the Greta's Grotto Site outlined in red.

The Principle of Dredging in the North Sound

Applicability of the CH2M Hill Report and the Environmental Impacts of Dredging

In 2002, CH2M Hill was commissioned by the Cayman Islands Government to undertake an assessment to develop a long-term plan for meeting future demands for aggregate and fill, while also minimising unavoidable impacts of dredging and mining on natural ecosystems.

As outlined in the CH2M Hill report, all dredging results in impact to the marine ecosystems within and potentially around the footprint of the works; even with the eventual or partial recovery of seagrass within the impacted area, the habitat would remain a man modified remnant of the currently existing healthy ecosystem. Although other dredged areas have been recolonised by seagrasses etc., the impact of dredging inevitably results in the removal of an area of ecological value for the period of time that recovery requires. In the case of Morgan's Harbour, Salt Creek, and The Shores dredged channels, the communities evident today have had 14 to 30 years to re-establish. Additionally, once an area has recolonised it is generally different in character to the previous un-impacted habitat. The recolonisation of an area by seagrass and algae should not be considered total ecological recovery as it does not account for the loss and continued absence of any other marine life supported in its previously undisturbed state.

Therefore, the effects of this project should not be considered in insolation. It should instead be considered as part of a larger, chromic and cumulative impact to the North Sound as a whole from incremental, smaller projects that have been approved over time both prior to and since the CH2M Hill study was published.

Good governance requires that decisions are not made in isolation of the overall picture, including the environmental health of the North Sound balancing g damage to ecosystems and loss of resources (public goods) for the financial benefit of a single private company and what may trickle down into the economy as a result of the project. The DoE considers the determination of this proposal to be precedent-setting for substantial dredging projects within the North Sound for the obtaining fill for an off-site development.

Principle of Dredging in the North Sound

The DoE **does not** support dredging in the North Sound. Such a permit should only be issued under truly exceptional circumstances, which do not pertain to this application. The CH2M Hill study regarding dredging in North Sound, published in 2002, concluded that there had been a significant loss (more than 20 per cent) of the unique shallow transitional habitat linking mangroves with seagrass beds along the western and southern shores of North Sound and that there was ample evidence that seagrasses and associated fish and invertebrate communities had not successfully recolonised dredging pit borrow areas, even after many years. Prohibiting further major dredging projects in the North Sound for aggregate and fill acquisition was thus a primary recommendation of that report. This policy and the recommendations of CH2MHill have, in the main, been adhered to by successive governments in recent years.

The proposal presented in the application represents a major dredging project of a large area of unique habitat (2.6 acres) that would be used for fill off-site on another project, instead of using fill sourced from licensed quarries like all other developers.

Alternatives to the Proposed Channel

The DoE **does not** support the proposed channel given:

- The precedent approval of this application would establish;
- The unjustifiable rationale that the fill is needed to make an off-site development financially viable;
- The resultant loss of relatively unique and ecologically valuable benthic habitat;
- The resultant loss of coastal mangroves and Mangrove Buffer Zone; and
- The potential negative impacts on water quality in the North Sound.

The applicant has straightforward alternatives available to them:

- The proposed senior living facility (Greta's Grotto) can acquire fill from licensed local quarries. This is the fair system available to all others on the island.

- The applicants can find a man-modified site which does not require such quantities of fill.

- To achieve navigational access to the man-made lake, the applicant can negotiate an easement across the parcel to the west (Block 20C Parcel 133) and behind the Mangrove Buffer Zone (see Figures 12 and 13). A similar approach was utilised by HH Ltd (by the Ritz canal) and resulted in greatly reduced environmental impacts. In this case, pursuing an easement west to join an existing canal or dredged area would reduce the environmental impact and eliminate both the need for dredging within the North Sound and unnecessary impacts to the Mangrove Buffer Zone.

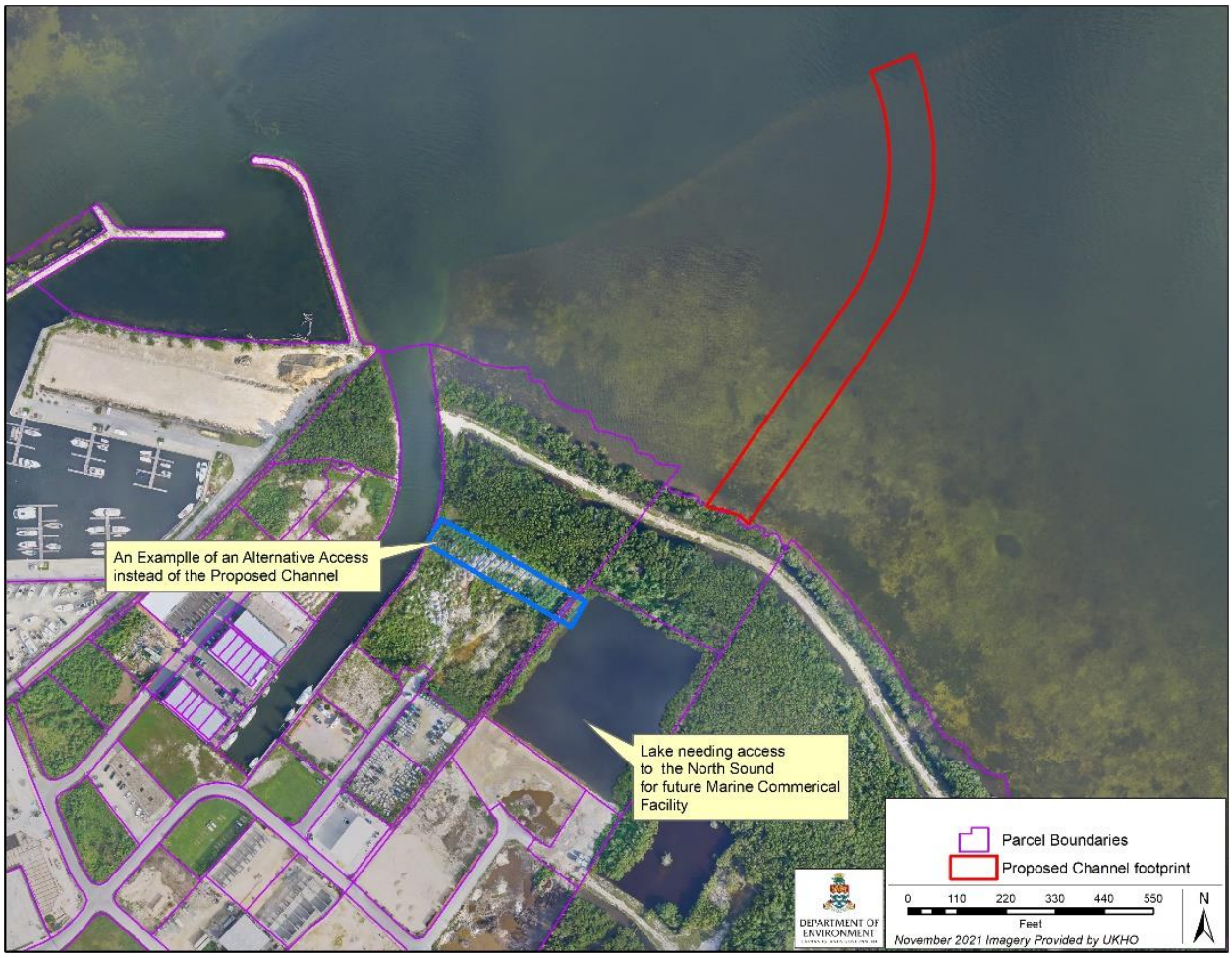


Figure 12: UKHO's 2021 aerial extract showing the man-made lake and neighbouring canals and an example of alternative access in blue through the adjacent parcel.

Figure 13: Cayman Land Info 2018 aerial extract showing the site of the proposed canal (outlined in red and subject to a planning application) connecting to the proposed channel and man-made lake) through the mangrove buffer highlighted in green.

Conclusion & Recommendations

The DoE **does not** support the approval of the proposed works given:

- The proposal would result in the loss of relatively unique and ecologically and economically valuable benthic habitat (i.e. aiding in replenishing fish nurseries, helping to mitigate the impacts of climate change by aiding in coastal protection, retaining the island's carbon sequestration potential and natural capital) for a small private development (i.e. with limited public benefit).
- The residual effects of turbidity on water quality and coastal resources in the North Sound.
- That this application appears to be primarily for the aggregate material needed to fill the Senior Facility Greta's Grotto; and that there is fill available from other on-island sources. The environmental impacts from the proposed navigational channel cannot be offset or justified for this purpose.
- The overall development (future commercial facility, inland canal & navigational access channel) should be reviewed holistically to determine the impacts to the North Sound and not in a piecemeal manner.

- There has been no commercial facility proposed and there is little space for any marina or facility on the parcel as the majority has either been excavated or is Mangrove Buffer Zone.
- The existing planning condition and quarry permit condition which states, "There shall be no connection of the lake to the sea" and the disapproval of the plan review for the 2023 planning application by the Water Authority.
- The continued proliferation of canal developments that are dependent on dredging activity to give them navigational access.
- The precedent this will set to allow for other dredging projects in the North Sound for fill materials for developments off-site.

We **strongly recommend that this application is refused** and that the Applicant is encouraged to explore alternatives to dredging the channel such as those discussed in the *Alternatives to the Proposed Channel* section of this review.

Director, Department of Environment