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**BASIC ASSESSMENT REPORT
EXPANSION OF INFRASTRUCTURE AT 99 COLWYN DRIVE
RESULTING IN THE INFILLING AND EXCAVATION OF MATERIAL
WITHIN 100M OF THE HIGH-WATER MARK OF THE SEA AND THE
EXPANSION OF INFRASTRUCTURE WITHIN 32M OF A
WATERCOURSE
KWADUKUZA MUNICIPALITY
DC29/0015/2021**



12th November 2021

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Cover image: MAP Architects 2021

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AUTHOR OF REPORT

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The EAP confirms that:

- a) All information contained in the Basic Assessment Report is, to the best of my knowledge, accurate and correct.
- b) Comments and input from stakeholders and registered Interested and Affected Parties have been included in the Basic Assessment Report.
- c) Input and relevant recommendations contained in the attached specialist reports have been included in the Basic Assessment Report and Environmental Management Programme.
- d) All relevant, available information has been provided to registered Interested and Affected Parties; and
- e) Responses to comments or inputs made by registered Interested and Affected Parties has been included under Appendix D.



Stephanie Denison

05th November 2021

EXECUTIVE SUMMARY

Michael Starr is in the process of subdividing his property located at 99 Colwyn Drive, Sheffield Beach (29°28'40.53"S; 31°15'48.32"E). The property is within Ward 22 of the KwaDukuza Local Municipality, iLembe District. Michael Starr will continue to own the northern subdivision (proposed Remainder of PTN 292 of Farm Lot 61 No. 1521) with the southern subdivision being sold to Rob Emanuel (proposed PTN 780 (of 292) of Farm Lot 61 No. 1521). Michael Starr and Rob Emanuel are the applicants.

The existing residential dwelling will be demolished, and two new private houses constructed on each of the subdivisions (House Starr and House Emanuel). Construction of House Starr and House Emanuel will take place within 100m of the high-water mark of the sea. A spring originates on the neighbouring southerly property. The existing development footprint will be expanded by more than 10m² of infrastructure within 32m of the watercourse. The expansion of infrastructure on the site as well as the excavation of material during construction, requires Environmental Authorisation from the Department of Economic Development, Tourism and Environmental Affairs (EDTEA).

Various technological alternatives have been assessed to ensure the preferred technology alternative for the disposal of sewage is used. The preferred alternative is for the sewage to be pumped directly into the Siza Water sewer reticulation network, avoiding onsite sewage disposal. Mitigation measures provided in the Ecological Impact Assessment, Geotechnical Report and Palaeontological Impact Assessment have been included in the Environmental Management Programme (EMPr), which is to be adhered to during construction.

The following provides a summary of the key findings of the Environmental Impact Assessment:

1. Indirect impacts on the adjacent beach environment during the infilling and excavation of material at 99 Colwyn Drive. Measures to manage excavations on site have been included in the attached EMPr which reduces the significance of the potential impact from moderate to low risk. These measures include the management of excess material excavated on site, the establishment of No-Go Areas and environmental awareness training to be conducted with all primary contractors prior to work commencing on site.
2. New infrastructure negatively impacting on coastal processes (i.e. sand sharing system). This impact was assessed by the coastal specialist, who concluded that all new residential infrastructure lies well above the sand sharing system and will therefore have little to no influence on coastal processes.
3. Expansion of infrastructure within close proximity to the watercourse resulting in direct physical impacts and long-term indirect impacts. The risk to the adjacent watercourse has been reduced in the preferred layout alternative for House Emanuel. Impact management measures have been included in the EMPr, which must be adhered to during construction. Potential indirect impacts on the watercourse have been avoided by using the preferred technology alternative for sewage disposal, compared to onsite sewage disposal.
4. General construction-related impacts (i.e. dust, noise, waste management etc.) will be managed in accordance with the EMPr attached under Appendix E.
5. Positive impacts associated with the project include the alignment of the proposed development with the current coastal management best practice guidelines (i.e. removal of existing concrete stairs down dune, collation of beach access points and connection to waterborne sewer reticulation network).
6. The long-term / operational phase of the expansion of infrastructure at 99 Colwyn Drive poses little to no risk on coastal processes and has a low-risk significance to the nearby watercourse.

All impacts identified in the Basic Assessment Report can be mitigated to an acceptable level of risk provided that the measures included in the attached EMPr are adhered to. The Environmental Assessment Practitioner is therefore of the opinion that the Expansion of Infrastructure at 99 Colwyn Drive Resulting in the Infilling and Excavation of Material within 100m of the High-Water Mark of the Sea and the Expansion of Infrastructure within 32m of a Watercourse (Layout Alt 2; Technology Alt 1) be authorised by EDTEA. Each landowner will be responsible for the implementation of the EMPr during the construction of the respective houses.

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1.0 INTRODUCTION

1.1 DESCRIPTION OF ACTIVITY TO BE UNDERTAKEN

Michael Starr is in the process of subdividing his property located at 99 Colwyn Drive, Sheffield Beach (29°28'40.53"S; 31°15'48.32"E; Figure 1). The property is within Ward 22 of the KwaDukuza Local Municipality, iLembe District. Michael Starr will continue to own the northern subdivision (proposed Remainder of PTN 292 of Farm Lot 61 No. 1521) that is 1 904m² in extent. The southern subdivision has been sold to Rob Emanuel (proposed PTN 780 (of 292) of Farm Lot 61 No. 1521) and is 2 129m² in extent. Michael Starr and Rob Emanuel are the applicants for the project.

There is currently one large residential dwelling and associated infrastructure on the property. All existing infrastructure will be demolished, and two new private residential dwellings constructed, one on each of the new subdivisions (House Starr and House Emanuel). The entire study area falls within 100m of the high-water mark of the sea. A spring originates 2.5m west of the property boundary, within close proximity to proposed House Emanuel. The following activities are proposed:

House Starr on Proposed REM of PTN 292 of Farm Lot 61 No. 1521:

- Demolition of existing residential infrastructure (465m²)
- Construction of new residential dwelling including driveway (772m²)
- Construction of a new swimming pool (40m²)
- Construction of timber staircase down dune (20m²)

During the construction of House Starr, the existing development footprint will expand by 365m² within 100m inland of the high-water mark of the sea. An estimated volume of 965m³ of material will be excavated / infilled within 100m of the high-water mark.

House Emanuel on Proposed PTN 780 (of 292) of Farm Lot 61 No. 1521:

- Demolition of existing residential infrastructure (600m²)
- Construction of new residential dwelling including driveway (670m²)
- Infilling of old swimming pool (\pm 100m³)
- Construction of a new swimming pool and associated deck (160m²)
- Construction of timber staircase down dune (20m²)

During the construction of House Emanuel, the existing development footprint will expand by 216m² within 100m inland of the high-water mark of the sea. An estimated volume of 870m³ of material will be excavated / infilled within 100m of the high-water mark. The existing development footprint will expand by 216m² within 32m of a watercourse.

A new sewer pipeline will be constructed along Colwyn Drive to connect the houses to the local sewer reticulation network. The sewer pipeline will be 236m in length x 75mm diameter and will be laid in a trench that is 400mm wide and 800mm deep. The excavation of the trench will result in 56m³ of material being excavated / infilled within 100m of the high-water mark.

The infilling and excavation of material within 100m of the high-water mark of the sea triggers Activity 19A of Listing Notice 1 (NEMA EIA Regulations 2014 as amended). The existing development footprint will expand by 216m² within 32m of the watercourse triggering Activity 23 of Listing Notice 3. The existing development footprint will be expanded by 581m² within 100m of the high-water mark of the sea triggering Activity 54 of Listing Notice 1. All listed activities being applied for are provided in Table 1 below.

Table 1: Listed and Specified Activities Triggered and Being Applied for.

Activity #	Relevant Listing Notice	Listed Activity Description as Per the Legislation	Listed Activity Description as Per the Project Description
19A (ii)	Listing Notice 1 (GNR327) 04 th December 2014 as amended.	The infilling or depositing of any material of more than 5m ³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5m ³ from	During construction of House Starr, approximately 965m ³ of material will be excavated and infilled within 100m of the high-water mark of the sea. Approximately 870m ³ of material will be excavated and infilled within 100m of the

		ii) the littoral active zone, an estuary or a distance of 100m inland of the highwater mark of the sea or an estuary, whichever distance is the greater.	high-water mark of the sea during the construction of House Emanuel. The excavation of the trench to accommodate the sewer pipeline along Colwyn Drive will result in 56m ³ of material being excavated / infilled within 100m of the high-water mark. Total volume of material excavated / infilled = 1 891m ³ .
54 (v) (e)	Listing Notice 1 (GNR327) 04 th December 2014 as amended.	The expansion of facilities - (v) if no development setback exists, within a distance of 100m inland of the high-water mark of the sea or an estuary, whichever is the greater; in respect of— (e) infrastructure or structures where the development footprint is expanded by 50m ² or more.	The existing development footprint will be expanded seawards by a total of 581m ² (House Starr expanded by 365m ² and House Emanuel expanded by 216m ²). The expansion of infrastructure will take place within 100m of the high-water mark of the sea.
23 (ii) (c) (d) (xi) (cc)	Listing Notice 3 (GNR324) 04 th December 2014 as amended.	The expansion of— (x) buildings where the building is expanded by 10 square metres or more in size; (xii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;] where such [development] expansion occurs— (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse.	The existing development footprint will be expanded by 216m ² within 32m of the spring which flows down the property boundary. The expansion of infrastructure within 32m of the watercourse will take place within 100m of the high-water mark of the sea during the construction of House Emanuel.

1.2 LOCATION OF ACTIVITY

Houses Starr and Emanuel are located at 99 Colwyn Drive in Sheffield Beach. The property is in Ward 22 of the KwaDukuza Local Municipality, iLembe District (centre of site: 29°28'40.53"S; 31°15'48.32"E). Please refer to Figure 1 for the Locality Map.

Property Description	Current property description: Portion 292 of Farm Lot 61 No. 1521. A subdivision application has been submitted and the following property descriptions are pending approval from the SG office: Remainder of Portion 292 of Farm Lot 61 No. 1521 (House Starr) Portion 780 (of 292) of Farm Lot 61 No. 1521 (House Emanuel)
21 Digit Surveyor General code (current)	N0FU00000000152100292

Figure 1: Locality Map with the Site Indicated by the Red Circle.



Figure 2: Site Development Plans Showing Proposed New Dwelling Footprints on Portion 292 of Farm Lot 61 No. 1521 (Source MAP Architects, 2021).

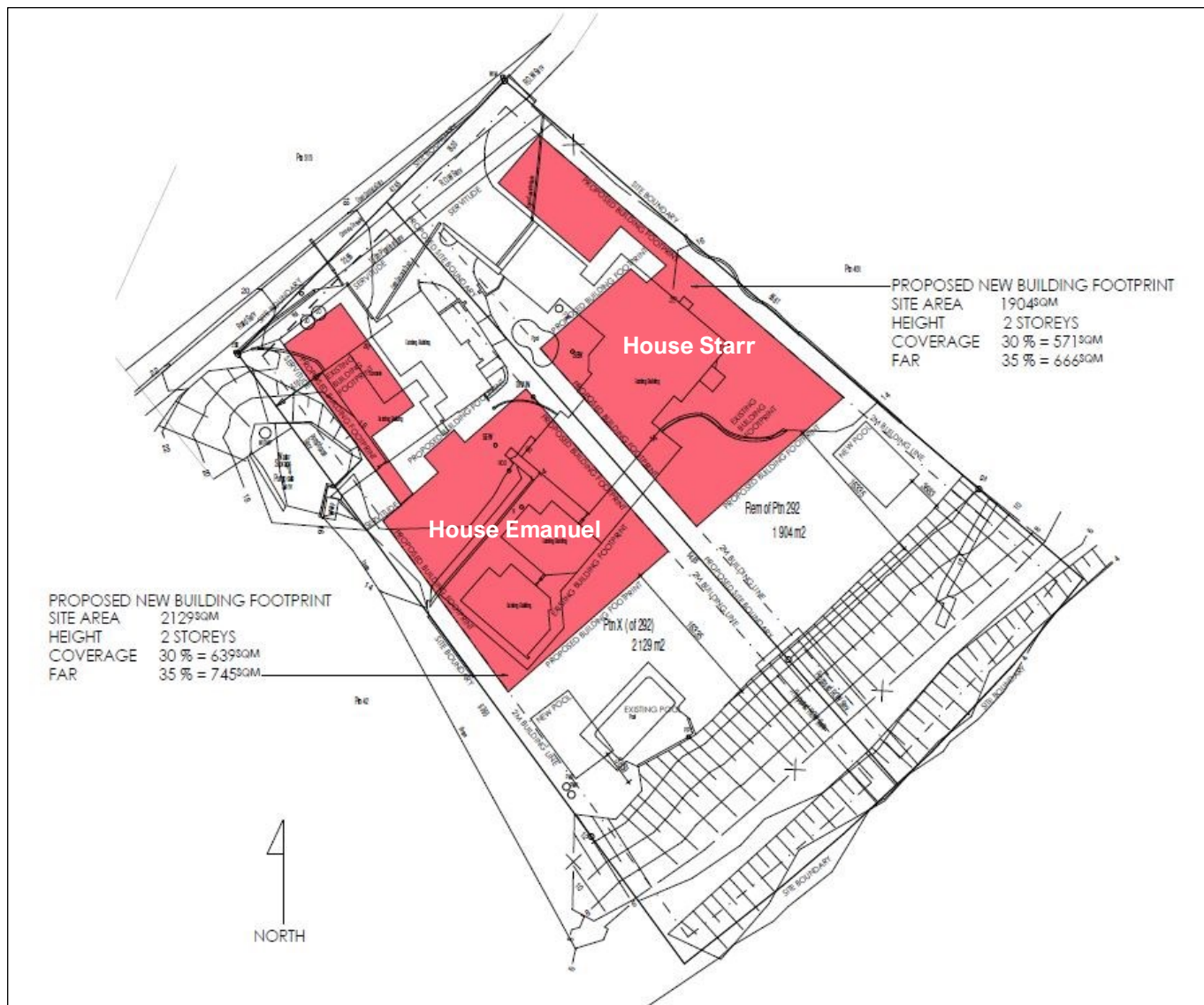
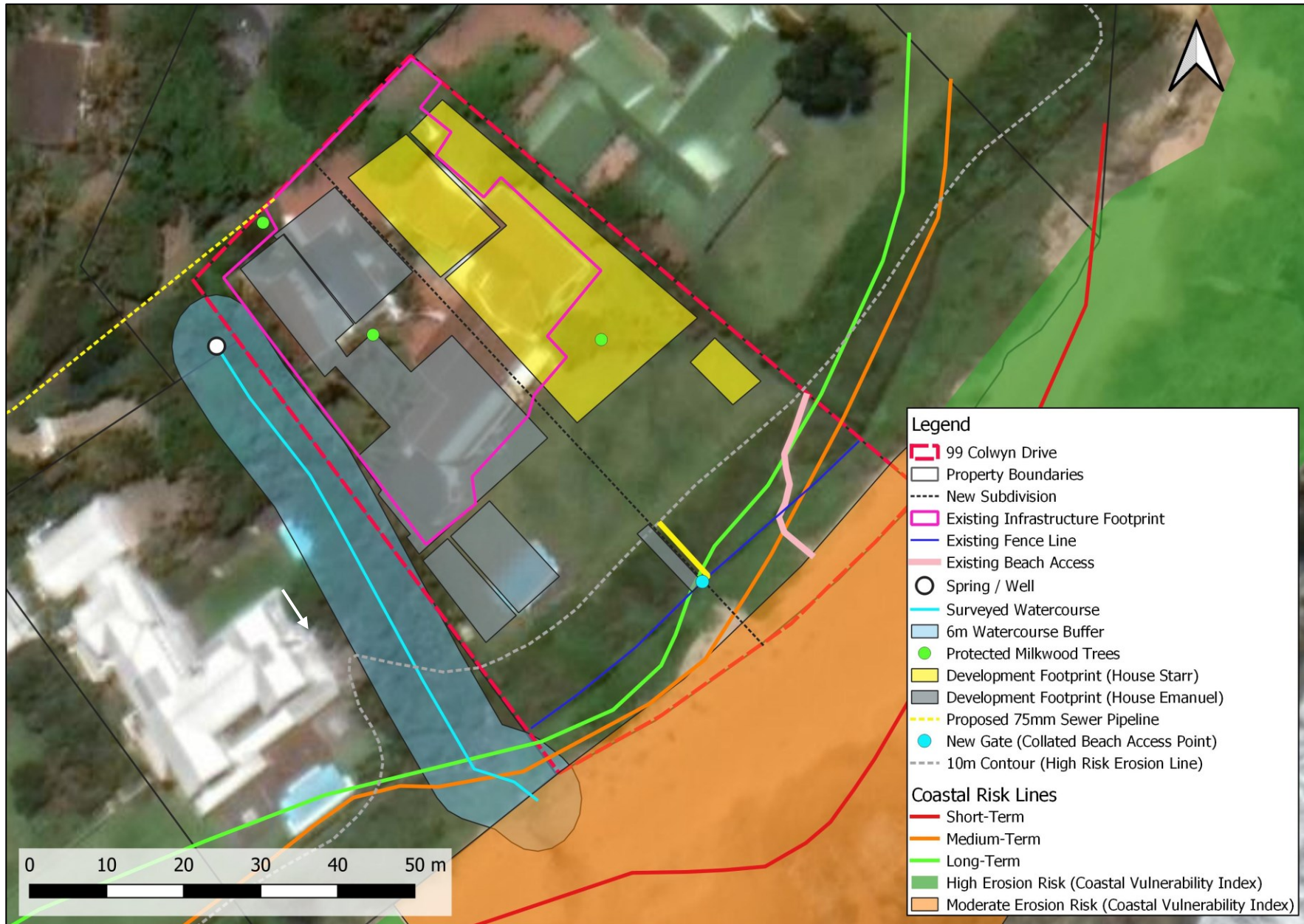


Figure 3: Map Superimposing the Proposed Activity and Associated Infrastructure on the Environmentally Sensitive Areas of the Site.



2.0 ALTERNATIVES

2.1 DETAILS OF ALTERNATIVES CONSIDERED

“Alternatives” are defined as “different means of meeting the general purpose and requirements of the activity”¹. Alternatives considered must be feasible and reasonable. The general purpose and requirement for this project is for the construction of new residential infrastructure to accommodate two families at 99 Colwyn Drive.

2.1.1 Site Alternatives and Outcome of the Site Selection Matrix

The proposed application is specific to existing Portion 292 of Farm Lot 61 No. 1521. The applicants are the current landowner and the new landowner. The applicants intend to construct private residential structures on the property. No other feasible site alternatives have therefore been considered.

2.1.2 Activity

As described above, the purpose of this project is to construct two new residential dwellings on each of the recently subdivided properties. No other feasible activities have therefore been considered.

2.1.3 Layout

The current landowner took ownership of the property in 1981 when Sheffield Beach first became a residential suburb. The property is described by the specialist as having “a highly transformed environment” with “little in the way of natural coastal habitat”². The proposed expansion of infrastructure takes place within the confines of the transformed environment. The 10m contour line is indicative of the high-risk coastal erosion line (refer to section 4.4 for more details). Apart from the staircase down to the beach, all other infrastructure proposed lies above the 10m contour line (grey dotted line in Figure 3). The development of residential infrastructure on site will therefore have no impact on the shoreline or sand sharing system³.

A development footprint has been provided for House Starr (internal design still underway). All development is located above the 10m contour and therefore, from an environmental perspective, there is no substantial difference in the layout of the house. Only one layout alternative for House Starr has been assessed.

Two layout alternatives have been assessed for House Emanuel, which will be located on the southern subdivision. Layout Alternative 1 (ALT 1) was originally proposed, and Layout Alternative 2 (ALT 2) is the preferred layout. As per the specialist recommendations, ALT 1 was amended to move the proposed garage further away from the embankment which drops down towards the watercourse (Figure 4).

Alternative layouts and designs were also considered for the proposed beach access. There is existing beach access down the dune which has been constructed out of concrete blocks. The applicants originally intended to have separate access paths down the dune with separate gates leading onto the beach. As per the Best Practice for Coastal Developments in KZN Guidelines⁴, it was recommended by the coastal specialist that access routes are collated into a singular route through dune onto the beach (Figure 5). The preferred design of the staircases takes into consideration the specialist recommendations with the structure being stilted and composed of organic material. The preferred design of the beach access staircases is provided in Appendix C.

¹ DEA & DP (2010) Guideline on Alternatives, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning (DEA&DP).

² Section 5.0 of the SDP “Ecological Impact Assessment” July 2021.

³ Executive Summary of the SDP “Ecological Impact Assessment” July 2021.

⁴ Bundy, S., Goble, B., Parak, O. and Bodasing, M. (2021). Best practices for coastal development in KwaZulu-Natal. KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, Pietermaritzburg, 102 pp.

Figure 4: Comparison of the Alternate and Preferred Layout for House Emanuel (Source: Map Architects, 2021).

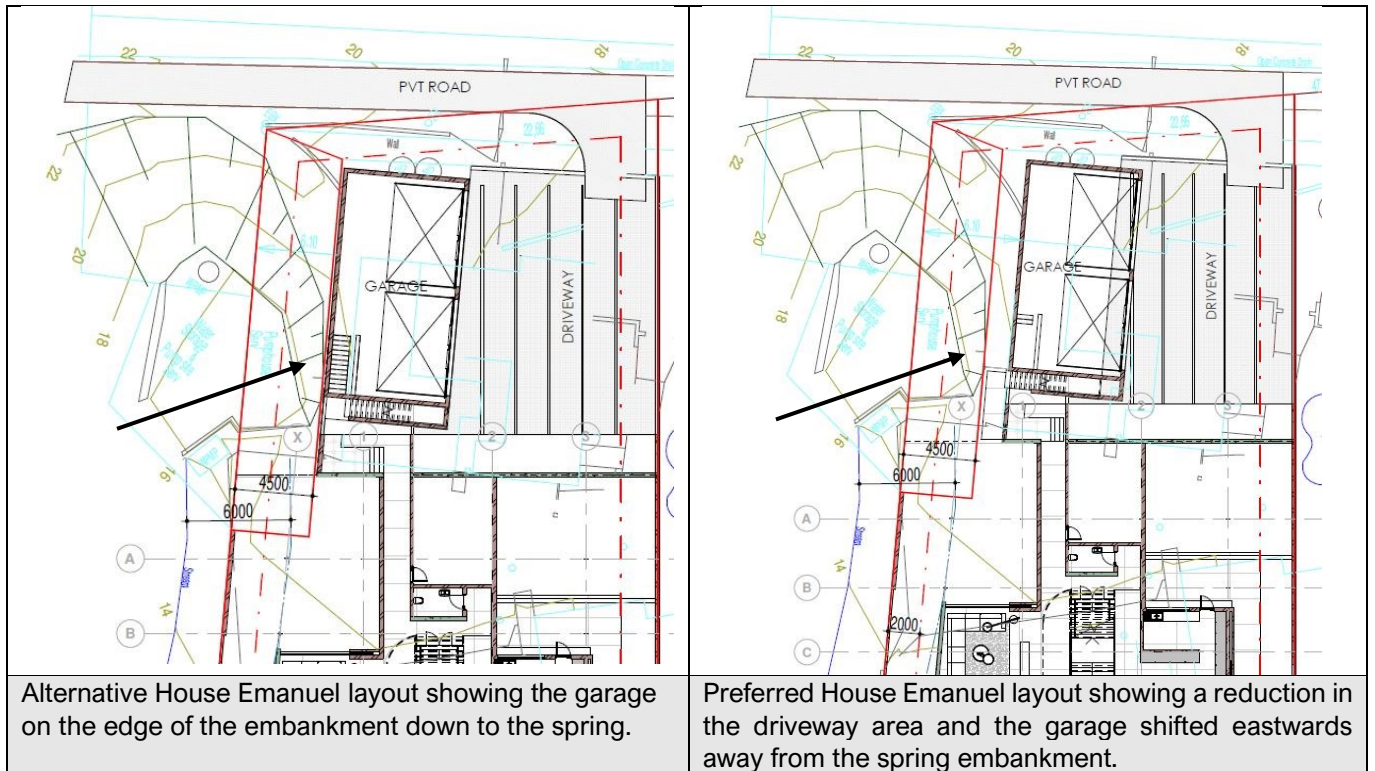
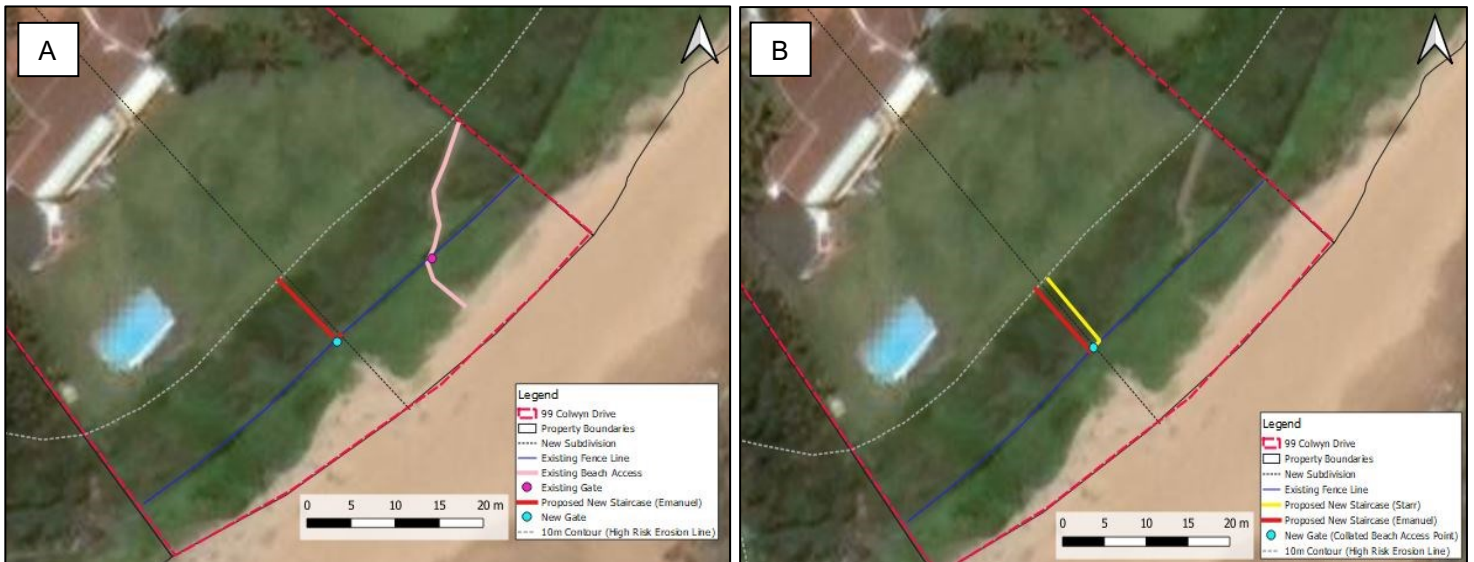


Figure 5: Image Showing the Alternate (A) and Preferred (B) Beach Access Layouts at 99 Colwyn Drive.



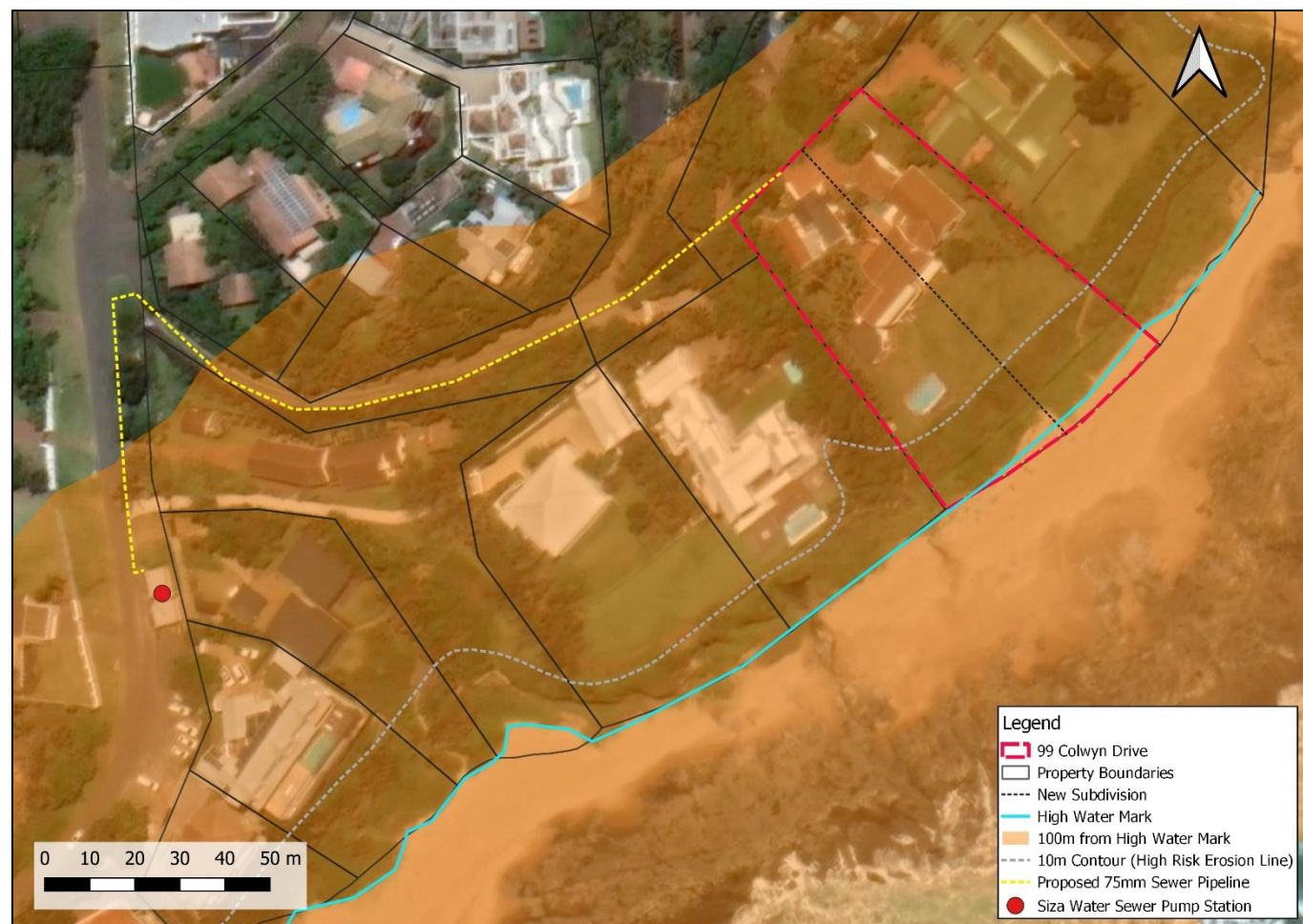
2.1.4 Technology

The existing residential dwelling uses a percolative septic tank system with the evapotranspiration area located on the lawn which extends in front of the house. It was originally proposed that both houses continue with onsite sewage disposal using septic tank sewage systems. After feedback was provided by the geotechnical engineer, it was concluded that there is insufficient area for effective evapotranspiration. As such, a number of alternative sewage disposal options were assessed:

- 1) Establish a conservancy tank for each of the houses. The landowners would be responsible for communicating with a licensed service provider to collect and dispose of the sewage off site;
- 2) A split system with a portion of the house having onsite sewage disposal (i.e. septic tanks) and the remainder of the house serviced using a conservancy tank; and
- 3) The construction of a 75 mm diameter HDPE Class 12 sewer pipe along Colwyn Drive connecting into the existing local sewer reticulation system.

The preferred alternative for sewage disposal is Technology Alternative 3, to connect to the existing sewer reticulation system (Figure 6).

Figure 6: Map Showing the Sewer Pipeline Route as the Preferred Method for Sewage Disposal.



2.1.5 No-Go Alternative

The demolition of the present residential infrastructure at 99 Colwyn Drive and the establishment of two new residential dwellings will not take place. There would be no negative environmental impacts that may have resulted from the construction phase. The coastal specialist noted that anticipated negative impacts associated with the proposed development have already been imposed upon the site and that the primary objective is therefore to align the development with the current coastal management concepts by ameliorating historical issues (i.e. removal of the concrete staircase currently in place through the dune vegetation and presenting sewer disposal alternatives to reduce the volume of onsite sewer disposal in close proximity to the beach)⁵.

2.2 CONCLUDING STATEMENT INDICATING PREFERRED ALTERNATIVES

Since the project is for the construction of two new residential structures at 99 Colwyn Drive, no other feasible site or activity alternatives have been assessed. In line with the specialist recommendations, the layout of House Emanuel has been amended to maintain the present distance from the watercourse (Layout Alternative 2). No layout alternatives have been assessed for House Starr as all infrastructure falls above the 10m contour high risk erosion line. Three technology alternatives have been assessed for the sewage disposal system. The preferred alternative is Technology Alternative 3, to connect to the existing sewer reticulation system.

⁵ Section 6.1 of the SDP "Ecological Impact Assessment" July 2021

2.3 MOTIVATION FOR PREFERRED ALTERNATIVE

The following provides a summary motivating the preferred layout and technology alternatives (Layout Alternative 2 and Technology Alternative 3):

- All proposed new infrastructure associated with the expansion of the existing development footprint is above the 10m contour erosion risk line and will therefore have little to no influence on coastal processes or the natural environment.
- The preferred layout alternative for House Emanuel takes into consideration the steep, unstable embankment associated with the natural spring. The garage has been shifted away from the top of the embankment in the preferred layout.
- The beach access point has been collated to ensure minimal disturbance occurs on the dune cordon, in line with the Best Practice for Coastal Developments in KZN Guidelines. A floating, light weight staircase is proposed down the dune cordon.
- There is insufficient evapotranspiration area on the site for onsite sewage disposal and therefore the preferred technology alternative for sewage disposal is to connect to the existing sewer reticulation network, located 236m west of the property. A conservancy tank system is feasible however is reliant on ongoing monitoring and maintenance from the landowners. A split system is also feasible for onsite sewage disposal (i.e. septic tanks and conservancy tanks) however more input is required from the engineers to calculate the effective evapotranspiration area available. The project engineer has contacted Siza Water, who have confirmed that the proposed sewer pipeline connection is feasible.

3.0 PLANNING CONTEXT

3.1 ENVIRONMENTAL POLICY AND LEGISLATIVE CONTEXT

The table below provides a list of legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments relevant to Houses Emanuel & Starr at 99 Colwyn Drive. The table includes comment on how the proposed development complies with and responds to the listed legislation.

Table 2: Legislation, Policies, Plans, Guidelines, Spatial Tools, Municipal Development Planning Frameworks, And Instruments Relevant to Houses Emanuel & Starr at 99 Colwyn Drive.

Legislation	Acronym	Comment
National Environmental Management Act (Act No. 107 of 1998 as amended).	NEMA	NEMA provides environmental management principles that are applicable across South Africa to fulfil section 24 of the Constitution, which is the right to “ <i>an environment that is not harmful to their health or wellbeing</i> ”. Section 24 of NEMA defines the activities requiring Environmental Authorisation and the processes to be followed to obtain Environmental Authorisation (published in the Environmental Impact Assessment Regulations, 2014 as amended). This application triggers activities listed in Listing Notices 1 & 3 of the Environmental Impact Assessment Regulations, 2014 as amended. A Basic Assessment process is therefore underway to obtain Environmental Authorisation prior to any activities commencing.
DEA (2017), Public Participation guideline in terms of NEMA EIA Regulations, DEA, Pretoria, South Africa.	-	To give effect to section 2 (4)(f) and (o) of NEMA, adequate and appropriate opportunity for public participation in decisions that may affect the environment is required. NEMA requires that any person conducting public participation take into account any relevant guidelines applicable to the public participation process as contemplated in section 24J of NEMA. The public participation conducted as part of the Basic Assessment process complies with the NEMA EIA Regulations and has considered the relevant guidelines.
DEA (2017), Guideline on Need and Desirability, DEA, Pretoria, South Africa.	-	This guideline contains information on best practice and how to meet the requirements prescribed by NEMA when considering the need and desirability of a development. The need and desirability of the project has considered the list of questions outlined in the Need & Desirability Guidelines.

National Environmental Management: Waste Act (Act No. 59 of 2008 as amended).	NEM: WA	NEM: WA provides measures to protect health and the environment of South Africa by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. There are no activities proposed that will trigger a Waste Management License however measures have been provided in the EMPr to ensure that waste management is compliant with the requirements of NEM: WA.
National Environmental Management Biodiversity Act (Act No. 10 of 2004).	NEM: BA	To manage and conserve South Africa's Biodiversity and protect species and ecosystems that warrant national protection. The proposed development does not require any specific permissions in terms of NEM:BA however the landowner must comply with the requirements of the Alien and Invasive Species Regulations (2020) which have been published in terms of section 97(1) of NEM:BA. These regulations categorise invasive species and outlines the way these species must be controlled by landowners. Section 52 of NEMBA allows for the publication of a national list of ecosystems that are threatened and in need of protection. The property is located within the Northern Coastal Grasslands Ecosystem which has been identified as " <i>critically endangered</i> " by the South African National Biodiversity Institute (SANBI). The vegetation on site has however been completely transformed by landscaping.
National Environmental Management: Air Quality Act (Act No. 39 of 2004).	NEM: AQA	Regulates air quality to protect the environment by providing measures to prevent pollution and ecological degradation and for securing ecologically sustainable development. There are no activities on site that will trigger an Air Emissions License however measures have been provided in the EMPr to ensure that air quality is managed in line with the requirements of NEM: AQA.
National Water Act (Act No. 36 of 1998) (as amended).	NWA	Provides for fundamental reform of the law relating to water resources. A natural spring originates near the north-western corner of the property (Figure 9h). Infrastructure will be constructed within 100m of the spring potentially triggering a section 21(c) & (i) Water Use Authorisation. Provided that the houses connect to the sewer reticulation network, a section 21(g) water use can be avoided. The EAP is to request a pre-application meeting with the Department of Water and Sanitation (DWS) to confirm whether a Water Use Authorisation application is necessary on a previously developed site.
National Forests Act (Act No. 84 of 1998).	NFA	To conserve and protect natural forests and woodlands as well as ensuring development with principles of sustainable management. The Department of Forestry Fisheries and Environment (DFFE) governs the removal, disturbance, cutting or damaging of protected tree species and natural forests. There are no natural forests on site. The specialist has identified three <i>Mimusops caffra</i> trees within the study area. A permit from DFFE is required prior to the cutting, removal or disturbance to these protected trees.
Integrated Coastal Management Amendment Act (Act No. 36 of 2014).	ICMAA	Establishes an integrated coastal and estuarine management system to promote the conservation of coastal environment and maintain natural attributes of coastal landscapes and seascapes. Sound coastal management principles are presented in the ICMAA which are applicable to this application. The Coastal Vulnerability Index shows the site to have a " <i>moderate</i> " vulnerability. All infrastructure proposed falls within 100m of the high-water mark of the sea and therefore the layout needs to be " <i>economically justifiable and ecologically sustainable</i> ", which is a requirement of the ICMAA.

Best Practises for Coastal Development in KwaZulu-Natal (2021) ⁶	-	Recognises the interrelationships between coastal users and ecosystems. The Provincial Coastal Management Programme (PCMP) sets out objectives to ensure coastal development occurs in a manner that is appropriate, adaptive and systems-based. As a PCMP output, EDTEA produced this Guideline on best practises to be adopted for development along the coast. This development is classified as a private project in terms of these guidelines and adheres to the principles of development planning provided in this document.
National Heritage Resources Act (Act No. 25 of 1999).	NHRA	For the management of national heritage resources and to nurture and conserve heritage resources so that they may be bequeathed to future generations. The existing house is not a heritage feature (i.e. it is younger than 60 years). No structures with heritage or archaeological value are located on site. The property falls within a “moderate - low” sensitive palaeontological (i.e. fossils) area. A Desktop Palaeontological Impact Assessment was therefore carried out and is attached under Appendix B. The findings of the report are summarised in section 4.0 below.
iLembe District Municipality Integrated Development Plan (2020 – 2021 Review)	iLembe IDP	Provided that the construction is carried out in a sustainable manner, the activities proposed at 99 Colwyn Drive are in line with the iLembe District Vision outlined in section 1.2 of the iLembe IDP. This vision is “By 2030 iLembe District Municipality will be a sustainable people-centred economic hub providing excellent service and quality of life”.
KwaDukuza Local Municipality Development Spatial Framework (2017 – 2022)	KDM SDF	The proposed development is compliant with the existing property zoning parameters with no special consent required. The project is therefore in line with the KDM SDF for the area.

3.2 MOTIVATION FOR THE NEED AND DESIRABILITY

The need and desirability of a project is based on the principle of obtaining a sustainable development in that the proposal must be “*ecologically sustainable and socially and economically justifiable*”⁷. The property is well located in the sought-after coastal town of Sheffield Beach. The property is zoned for residential use with neighbouring properties to the north, south and west containing existing residential dwellings of a similar nature. The site and proposed activity are therefore considered to be desirable in terms of the municipal planning scheme for the area.

As per the Need & Desirability Guideline, the broader community’s needs and interests, as reflected in the municipal planning tools, need to be considered as these planning tools provide strategies to support economic growth. The project is for the expansion of a private residential infrastructure on the property to accommodate two families as opposed to one large house accommodating one family. The proposed new infrastructure is in line with the relevant municipal plans and framework for the area. The development will therefore not negatively impact on broader societies needs and interest.

The surrounding land uses include residential developments which are used as primary residence as well as holiday houses (see section 4.8 for more details on surrounding land uses). The proposed expansion of infrastructure on site is in line with the surrounding land uses.

The property has been completely transformed by historic use of the site for residential purposes (since approximately 1981). All new infrastructure proposed is leeward of the coastal erosion risk line and will have little to no risk on the sand sharing system. Access to the beach is collated with floating timber staircases proposed to limit the construction footprint down the dune. The distance between infrastructure and the watercourse has been maintained in the preferred layout with management measures included in the EMPr to prevent any indirect impact during the construction phase. The preferred layout and technology alternatives are therefore considered to be ecologically sustainable.

⁶ Bundy, S., Goble, B., Parak, O. and Bodasing, M. “*Best Practises for Coastal Development in KwaZulu-Natal*” KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, Pietermaritzburg (2021).

⁷ DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs (DEA), Pretoria, South Africa.

The proposed development is strategically located in an existing residential area. The activity will not significantly impact on the broader societal needs or the public interest. The preferred layout ensures an ecologically sustainable development proposal.

4.0 ENVIRONMENTAL ATTRIBUTES

A report was generated by the national web-based environmental screening tool in terms of section 24(5)(h) of NEMA and Regulation 16(1)(b)(v) of the EIA Regulations, 2014 as amended. The Department of Environment, Forestry and Fisheries (DEFF) Screening Tool is attached under Appendix B. The Screening Tool identifies potential specialist assessments which may be required for the application. It is the responsibility of the EAP to confirm this list and to motivate the reason for not including any of the identified specialist studies. Table 3 provides a list of the specialist studies identified by the Screening Tool and a motivation as to why the studies were or were not conducted.

Table 3: List of Specialist Assessments identified in the Department of Environment, Forestry and Fisheries Screening Tool Report.

Specialist Assessment	Included in Appendix B	Motivation for Not Conducting Assessment
Landscape / Visual Impact Assessment	No	The proposed development is similar to surrounding land uses. Properties on all boundaries of the study area have already been developed in a similar manner and therefore a Visual Impact Assessment was not considered necessary.
Archaeological and Cultural Heritage Impact Assessment	No	The existing house is not a heritage feature (i.e. younger than 60 years old). The site has no cultural value and therefore this assessment was not undertaken.
Palaeontology Impact Assessment	Yes	According to the SAHRIS PalaeoSensitivity Map, the study area falls within a "moderate to low" palaeontological sensitive area. A Desktop Palaeontological Impact Assessment was therefore carried out by Marion Brown and is attached to Appendix B. The findings of the report are summarised in section 4.5.
Terrestrial Biodiversity Impact Assessment	No	Vegetation on the property is mainly comprised of landscaped lawn grass. As per the SDP Ecological Impact Assessment the study area is "primarily a gardenscape" comprised of "tended lawns with occasional woody species, such as <i>Ficus lutea</i> and <i>Strelitzia nicolaii</i> ". The property is in a developed, urban area which is fenced off. A full Terrestrial Biodiversity Impact Assessment was therefore not deemed necessary however the specialist has included an assessment of the terrestrial environment of the site (Bullet point 1 under section 2.1. of the Ecological Impact Assessment attached under Appendix B).
Aquatic Biodiversity Impact Assessment	No	A natural spring / drainage features originates near the north-western corner of the property. The Ecological Impact Assessment carried out by SDP Ecological and Environmental Services assesses the potential impacts of the proposed activities within 32m of the watercourse (Bullet point 2 under section 2.1. of the Ecological Impact Assessment attached under Appendix B). A separate Aquatic Biodiversity Impact Assessment was not deemed necessary. The drainage feature is further described under section 4.5 of the Basic Assessment Report.
Marine Impact Assessment	Yes	The Ecological Impact Assessment carried out by SDP Ecological and Environmental Services includes the Coastal Vulnerability Assessment and assesses the impact of the development on the marine environment. The report is attached under Appendix B and the findings summarised in the sections below.
Avian Impact Assessment	No	The small development footprint within a developed urban area will not significantly impact any bird communities and therefore an Avian Impact Assessment was not considered necessary.

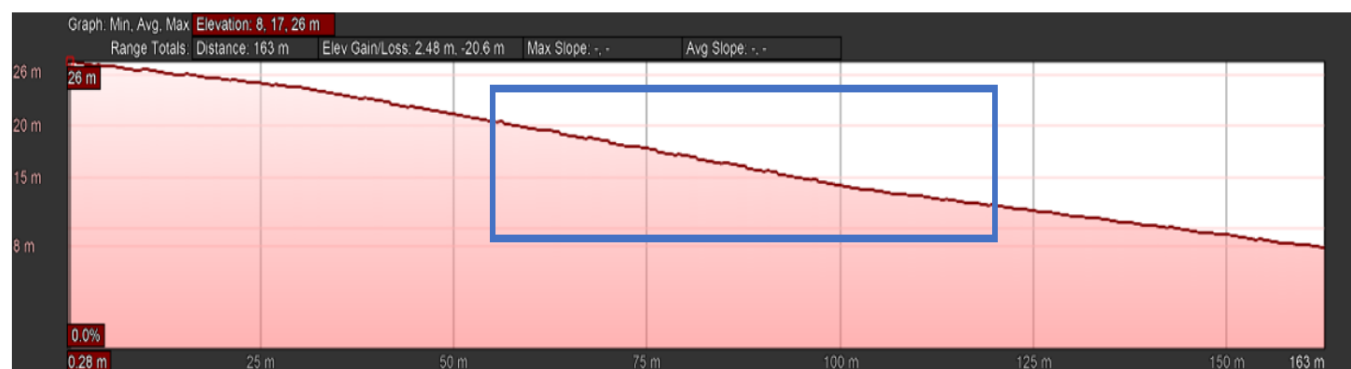
Geotechnical Assessment	Yes	A Geotechnical Report was carried out by Mono Block Geotechnical Laboratory and is attached under Appendix B. The findings of the report are summarised under section 4.2. with recommendations included in the EMPr.
Socio-Economic Assessment	No	As per section 3.2 above, the proposed development is in line with the municipal planning framework for the area and the property zoning. There will be no significant socio-economic impact on the Sheffield Beach area and therefore a Socio-Economic Assessment was not considered necessary.
Plant Species Assessment	No	The SDP Ecological Impact Assessment attached under Appendix B lists the plant species associated with the site “ <i>The vegetated component of the site comprises of tended lawns with occasional woody species, such as Ficus lutea and Strelitzia nicolaii. Other occasional species associated with the site include Carissa macrocarpa, Aloe thraskii and Chrysanthemoides monilifera which have in most instances been incorporated into the horticultural regime. Two species of conservation interest and significance noted on site include Mimusops caffra and Hibiscus tiliaceus</i> ”. The fauna is further described under section 4.3 of the Basic Assessment Report.
Animal Species Assessment	No	The property is in a developed, urban area which is fenced off. The development will not impact any animal species and therefore this assessment was not deemed necessary.

Information provided in the specialist assessments has been used to describe the receiving environment. All mitigation measures and recommendations provided by the specialists has been incorporated into the Assessment of Impacts Table under section 6.0. and the EMPr provided under Appendix E. All specialist assessments are attached under Appendix B.

4.1 PHYSICAL CHARACTERISTICS OF THE SITE

The existing residential structure at 99 Colwyn Drive is located between 10m and 25m above mean sea level (Figure 7) and lies on a secondary dune. The gradient of the site is described in the Geotechnical Report as “*moderate*”⁸. The natural slope has been flattened during previous earthworks and the actual platform where the existing house is built has a gentle to flat ground slope. The property is approximately 200m north of the Christmas Bay Beach and is bordered by the beach and ocean on the eastern side. The eastern boundary of the property is located 20m landward of the high-water mark of the sea with the entire property as well as Colwyn Drive, falling within 100m of the high-water mark.

Figure 7: Elevation Profile of the Application Area. The Study Area Associated with 99 Colwyn Drive is Indicated by the Blue Rectangle (East to West Profile; Google Earth Pro, 2021).



⁸ Monoblock Geotechnical Laboratories (Pty) Ltd “Proposed new double storey house with loft apartments and swimming pool for Mr. and Mrs. Emmanuel on Portion 292 of Farm Lot 61 No. 1521, Sheffield Beach Ballito” attached under Appendix B.

4.2 GEOGRAPHICAL ATTRIBUTES AND GEOLOGY

A Geotechnical Investigation was carried out by Marula Consulting (Pty) Ltd. The report is attached under Appendix B. The field investigation showed that the site is comprised of three types of material: fill materials, transported sediments and weathered bedrock. Further inspection revealed that “*the site is underlain by the fill materials followed by the transported sediments which overlies the weathered diamictite of the dwyka formation.*” In addition, it was noted that “*the transported sediments are made up of littoral sands.*” The geologist describes the soil consistencies across the site as “*high variable*”. The poorly graded, silty sand noted by the geologist on site is susceptible to surface erosion (wind and water) and therefore stormwater management during construction and re-vegetation of exposed areas is important.

The geologist concluded that “*the site considered suitable for the construction of the proposed double storey house with loft apartments and swimming pool provided that the recommendations given in this report are adhered to.*” Recommendations made in the Geotechnical Report have been included as mitigation measures under section 6.0 of the Basic Assessment Report.

4.3 FAUNA AND FLORA

The study area falls within the Northern Coastal Grasslands ecosystem. This ecosystem has been classified as “*critically endangered*” by SANBI. The site is comprised of two biomes, KwaZulu-Natal Coastal Belt Grassland and Subtropical Seashore vegetation⁹. KwaZulu-Natal Coastal Belt Grassland can be described as a highly dissected undulating coastal plain environment, which was historically covered by subtropical coastal forest. Subtropical Seashore vegetation is characterised by recent/young coastal sandy sediments which form beaches and dunes that support herbaceous and dwarf-shrubby vegetation.

The vegetation on the site itself is described by the specialist as “*primarily gardenscape, showing only limited psammoserai or coastal /dune habitat*”¹⁰. The leeward vegetation on the dune is composed of *Carissa macrocarpa*, *Aloe thraskii*, and *Chrysanthemoides monilifera*. The vegetation specialist noted two species of conservation concern within the study area, *Mimusops caffra* and *Hibiscus tiliaceus*. *Hibiscus tiliaceus* is associated with the drainage feature along the western property boundary and will not be impacted by the proposed activities. *Mimusops caffra* (Milkwood) is listed as a protected tree under the National Forest Act of 1998 and therefore requires a permit from DFFE prior to the cutting, removal or disturbance to these trees. The protected trees are shown in Figure 3. One of the trees will be removed to accommodate House Starr.

A portion of the property falls within an area identified by Ezemvelo KZN Wildlife as a Critical Biodiversity Area (see Figure 12 of the Ecological Impact Assessment attached under Appendix B). Critical Biodiversity Areas (CBA) are areas considered to be in sound ecological condition and are irreplaceable in terms of provincial biodiversity targets¹¹. Considering the location of the site within a residential area and the description of the vegetation associated with the site, the CBA should be restricted to the dune and beach environment, which is excluded from the proposed development activities.

Development will take place in an existing urban area that is fenced off. No faunal species were therefore identified on site.

4.4 COASTAL VULNERABILITY

Beach and dune environments are continuously changing and shaped by wave, wind and sediment transport within the sand sharing system¹². With the development of Sheffield Beach into a residential suburb in the 1900's, much of the terrestrial component of the sand sharing system has become highly transformed, altering the sand sharing dynamics. The coastal specialist describes the coastline associated with the Sheffield Beach area as being comprised of “*a number of rocky promontories and “pocket beaches” covered by a generally thin veneer of sand. The supra tidal coastal environment varies from steep cliffs to low elevation and relatively “young” sand dunes that are backed by older (+/- 10000 yrs BP) paleo dunes and earthen cliff*”. The sand sharing system in this area is dynamic and more energised compared to Durban, where wave energy is dissipated further away from the beach. Waves are of low to moderate energy most of the time in the Sheffield Beach area.

⁹ Mucina L M and M Rutherford “*The Vegetation of South Africa, Lesotho and Swaziland*. Strelitzia (2006).

¹⁰ “*Psammoserai vegetation*” is vegetation which occurs on exposed coastal sand.

¹¹ Section 4.0 of the SDP “*Ecological Impact Assessment*” July 2021.

¹² Section 4.0 of the SDP “*Ecological Impact Assessment*” July 2021.

The 2007 marine storm event is the highest wave run up event recorded along the coastline where historical information can be assessed. Studies suggest that the 2007 marine storm event has a 32-year return period¹³. The highest recorded wave run up associated with the 2007 storm event is therefore a reliable indicator of the extent of future wave inundation and can be used to understand the sand sharing system along this stretch of the coastline. Taking a maximum sea level rise of 0.8m over the next 25 years, the specialist recommended that development setbacks must take this into consideration to prevent damage during future storm events.

According to the CoastKZN database, the study site falls within a long-term (100 year) risk category and is considered to be “*moderate risk*” in terms of the Coastal Vulnerability Index (indicated in Figure 3). Sites considered moderate risk are those that have medium risk in terms of erosion, sea level rise and extreme events.

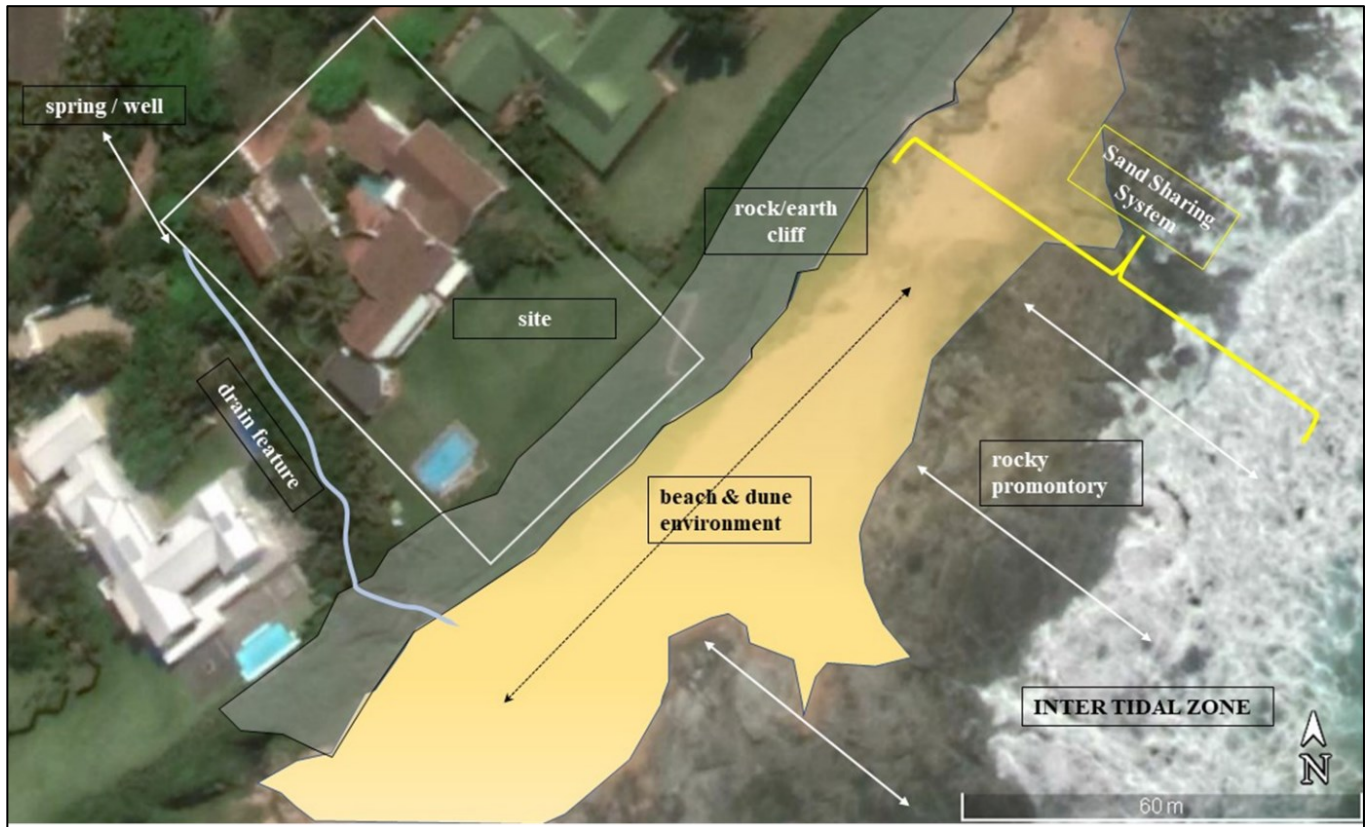
Section 5.0 of the Ecological Impact Assessment attached under Appendix B describes the coastal environment associated with 99 Colwyn Drive. It is summarised as follows:

- The property lies above a steep, secondary dune and cliff form at the northern extent of Christmas Bay (10-12m above the beach).
- Christmas Bay is a rocky bay encapsulated by two rock promontories and significant inshore reef. The reef and promontories serve to focus wave energy onto the shoreline, particularly those swells emerging from the south.
- Using imagery after the 2007 marine storm event as well as contour data, the specialist concludes that the wave run up associated with the 2007 storm approximated the 10m contour. Imagery of the site after the 2007 storm event is provided in the Ecological Impact Assessment (Figure 16). The existing swimming pool on site falls just above the 10m contour line and was not impacted by the storm. The existing concrete stairway to the beach lies below the 10m contour and was heavily damaged. Therefore, all proposed structures on the property must be set back from the identified 10m contour.
- The site is underlain by highly fractured sandstone geology, which offers some resistance to strong wave forcing, however seepage as well as percussion induced fracturing of the cliff face by high waves may give rise to chronic, but low-level erosion of the cliff.
- The beach form lying immediately below the property is primarily a boulder strewn hummock dune formation, with the earthen – rocky cliff form leading to the subject sites being composed of early seral dune vegetation, including *Gazania rigens* and *Carpobrotus dimidiatus*.

The findings and recommendations made in the Ecological Impact Assessment have been included as mitigation measures under section 6.0 of the Basic Assessment Report.

¹³ As above.

Figure 8: Aerial Photograph Showing Features and Coastal Dynamics Associated with House Gotz (Source: SDP, April 2021).



4.5 WATERCOURSES

A drainage feature was identified on the southerly neighbouring property (Figure 8). The existing residential house is located 6m away from the watercourse at its closest point. The specialist suggests that “*this feature has arisen through the excavation and containment of a surface seep associated with a sandstone fracture*”¹⁰. It is thought that the drainage feature serves to direct water overflows from a “*well towards the dune face and flows across the neighbouring property*”, where *H. tiliaceus* has been planted to promote stability.¹⁰ Photographs of the watercourse have been provided in Figure 9h.

According to the Ecological Impact Assessment, the well has been in place for some decades and formed the primary source of water for some of the homes in the area. The water source must therefore not be impacted on during construction as well as indirectly affected once construction is complete.

The findings and recommendations made in the Coastal and Aquatic Assessment have been included as mitigation measures under section 6.0 of the Basic Assessment Report.

4.6 CULTURAL AND HERITAGE

The existing house on site is younger than 60 years. There is no known cultural significance associated with the area and no graves. The underlying geology is that of a very narrow band of Dwyka Group diamictites and tillites that are exposed along the beach in patches. This stratum may preserve fragments of *Glossopteris* leaves, wood fragments and invertebrates. According to the SAHRIS PalaeoSensitivity Map, the study area falls within a “*moderate to low*” palaeontological sensitive area. A Palaeontological Impact Assessment was therefore undertaken by Professor Marion Bamford (Appendix B).

Fossils would only occur in the mudstone facies. These rocks are generally not very hard and therefore are easily broken down by wave action due to the close proximity to the beach. The specialist concluded that “*it is very unlikely that any fossils would be found in the loose sand that covers the surface and is penetrated by tree roots. Fossils might*

occur in the mudstones (if present) below the surface”¹⁴. A Fossil Chance Find Protocol has therefore been included in the EMPr”.

The findings and recommendations made in the Palaeontological Impact Assessment have been included as mitigation measures under section 6.0 of the Basic Assessment Report.

4.7 SOCIO-ECONOMIC PROFILE

The study area falls in the Ward 22 of KwaDukuza Local Municipality, iLembe District. The property forms one of the 30 homesteads that are located at Christmas Bay, seaward of Colwyn Drive. The area mainly consists of a large, free-standing homes that form the northern-most extent of Sheffield Beach / Salt Rock area. There is limited retail and commercial developments in the Sheffield Beach area. The expansion of residential infrastructure on the property is therefore aligned with the socio-economic environment of the area.

4.8 SURROUNDING LAND USES

The table below shows the existing land uses surrounding the study area. There are existing residential dwellings directly north, east and west of the property. The Indian Ocean is directly south-east of the property.

Table 4: Land Uses Surrounding 99 Colwyn Drive, Sheffield Beach.

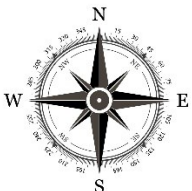
	Residential Dwelling & 99 Colwyn Drive	Residential Dwelling	Residential Dwelling
	99 Colwyn Drive	Application Area	Frontal Dune & Indian Ocean
	Residential Dwelling	Frontal Dune & Indian Ocean	Frontal Dune & Indian Ocean

Figure 9: Photographs Showing the Characteristics of the Site Taken on the 19th April and 10th August 2021: (a) Entrance to the property off Colwyn Drive; and (b) Photograph taken in the northern portion of the property in front of the existing house.



¹⁴ Section 4.0 of the “Palaeontological Impact Assessment for the Proposed Project on 99 Colwyn Drive, Sheffield Beach, North Coast, KwaZulu Natal Province” (July 2021).

Figure 9 (cont.): Photographs Showing the Characteristics of the Site Taken on the 19th April and 10th August 2021: (c) North-eastern property boundary. House Starr will be constructed in this portion of the site; (d) The existing concrete staircase down the dune providing beach access; (e) Front of the property where the gradient increases with the dune cordon; (f) The existing fence line associated with the southern property boundary; (g) The existing residential dwelling which will be demolished. House Emanuel is proposed on the left of the photograph and House Starr on the right; and (h) Arrow indicating the natural spring / well located near the north-westerly corner of the property.



5.0 PUBLIC PARTICIPATION PROCESS

5.1 DETAILS OF PROCESS UNDERTAKEN IN TERMS OF REGULATION 41 OF THE EIA REGULATIONS

Please refer to the Public Participation Report attached under Appendix D for all details on the public participation process followed and proof of communications. Notification of all potentially Interested and Affected Parties (I & APs) took place using the following methods:

- (a) Noticeboard on the boundary of the site;
- (b) Written notification to adjacent landowners, adjacent occupiers, the relevant municipal ward councillor, the municipality and all other responsible organs of state; and
- (c) Advertisement placed in the local newspaper.

A copy of the Draft Basic Assessment Report was provided to all I & APs for a 30-day comment period. Once all comments have been responded to, the Basic Assessment Report will be updated and submitted to EDTEA for assessment. I & APs will also be provided an opportunity to comment on the Final Basic Assessment Report. EDTEA have a legislated period of 107 days to assess the application. Registered I & APs will be notified of the outcome of the application.

5.2 SUMMARY OF ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

No comments have yet been received on the application. This section of the report will be updated prior to the submission of the Final Basic Assessment Report to EDTEA.

6.0 IMPACT ASSESSMENT

The aspects and impacts listed in the table below have been identified by reviewing the receiving environmental characteristics of the site (geographical, physical, biological, social, economic, heritage and cultural), having an understanding of the environmental impacts caused by similar activities as well as input from the specialist team.

The significance of the impact (before and after mitigation) has been calculated using the recognised quantified methods described in the Department of Environment, Forestry and Fisheries Integrated Environmental Management Information Series (Series 5 on Impact Significance). The following criteria has been used to assess the significance of the impacts identified:

Table 5: Criteria Used to Assess the Significance of Impacts Identified.

Criteria	Rating
Extent of Impact <i>Size of area that will be affected by the impact</i>	<ul style="list-style-type: none"> ▪ Site ▪ Local (<10km from site) ▪ Regional (>10km from site)
Duration of the Impact <i>Timeframe during which the impact will be experienced</i>	<ul style="list-style-type: none"> ▪ Short / once off ▪ Medium / during operation ▪ Long-term / permanent
Severity of the Impact <i>Anticipated consequence of impact</i>	<ul style="list-style-type: none"> ▪ Slight ▪ Moderate ▪ Substantial ▪ Severe ▪ Extreme
Probability <i>Probability of the impact occurring</i>	<ul style="list-style-type: none"> ▪ Very likely ▪ Likely ▪ Unlikely ▪ Very unlikely ▪ Extremely unlikely
Irreplaceability <i>Degree of which the impact causes irreplaceable loss of resources.</i>	<ul style="list-style-type: none"> ▪ High (activity will destroy resources that cannot be replaced) ▪ Moderate ▪ Low
Degree of Certainty <i>Confidence of impact rating based on available information</i>	<ul style="list-style-type: none"> ▪ High ▪ Moderate ▪ Low

<p>Significance of Impact <i>(Severity x Probability calculated as per the figure below)</i></p>	<ul style="list-style-type: none"> ▪ Very low (very minor alterations of the environment and can be easily avoided by implementing mitigation measures) ▪ Low (minor alterations of the environment and can be easily avoided by implementing mitigation measures) ▪ Moderate (moderate alteration of the environment and can be reduced/avoided by implementing mitigation measures) ▪ High (major alteration to the environment even with the implementation of mitigation measures) ▪ Very high (Very major alteration to the environment even with the implementation of mitigation measures. The impact will have an influence on decision-making)
<p>Ranking of residual impacts <i>Ranking of impact remaining after mitigation</i></p>	<ul style="list-style-type: none"> ▪ 5 (very low) ▪ 4 (low) ▪ 3 (moderate) ▪ 2 (high) ▪ 1 (very high)

The significance of the impacts has been assessed both with and without mitigation actions. Describing the impacts in terms of the above criteria aims to provide a consistent and systematic approach for authorities to rate the effectiveness of the mitigation measures provided and assist with the assessment of the application. The *Significance of Impact* rating is calculated according to the guide below.

Figure 10: Guide to Calculating the Significance of an Impact Based on the Severity and Probability of the Impact Occurring.

		Significance of Impact = Severity x Probability				
Probability	Very Likely	Very Low	Low	Moderate	High	Very High
	Likely	Very Low	Low	Moderate	High	High
	Unlikely	Very Low	Low	Moderate	Moderate	Moderate
	Very Unlikely	Very Low	Low	Low	Low	Low
	Extremely Unlikely	Very Low	Very Low	Very Low	Very Low	Very Low
			Slight	Moderate	Substantial	Severe
		Severity				

Table 6: Assessment of Impacts Associated with the Preferred Layout and Technology Alternatives for the Expansion of Infrastructure at 99 Colwyn Drive (Layout Alternative 2 and Technology Alternative 3).

Aspect	Impact	Extent	Duration	Severity	Probability	Irreplaceability	Mitigation	Significance of Impact (Severity x Probability)		Ranking of residual impacts	Degree of Certainty
								Without mitigation	With Mitigation (residual impact)		
CONSTRUCTION											
1. Demolition of infrastructure at 99 Colwyn Drive.	<p>a. Heavy vehicles operating on site encroaching into sensitive environmental areas (i.e. front of dune and adjacent watercourse).</p> <p><i>House Starr & House Emanuel</i></p>	Local	Short-term	Substantial	Likely	Low	<ul style="list-style-type: none"> Prior to demolition commencing, the Contractor must undergo environmental induction training prior (see Environmental Awareness Plan under section 5.0 of the EMPr). Induction training must include the identification and demarcation of sensitive areas. Two temporary fences must be erected on site prior to demolition commencing (drawn in purple in Figure 12): <ul style="list-style-type: none"> Along the top of the bank before the platform drops down towards the beach. Along the edge of the embankment which drops down to the natural spring / well. No vehicles, machinery, personnel, or material is permitted beyond the temporary fences. 	Moderate	Low	4	High
	<p>b. Incorrect disposal of waste and rubble.</p> <p><i>House Starr & House Emanuel</i></p>	Regional	Short-term	Moderate	Unlikely	Low	<ul style="list-style-type: none"> The main house and associated out buildings must be stripped first, and the materials recycled or reused prior to demolition of the structure commencing. This will reduce the volume of rubble generated. All rubble must be removed off site unless permission has been obtained from the engineer that rubble can be used a fill material / buried on site. All waste / rubble must be disposed of at a licensed landfill site. Proof of safe disposal must 	Low	Very Low	5	High



							<p>be provided to the ECO and retained for record keeping purposes.</p> <ul style="list-style-type: none"> Water from the existing swimming pool and pond must be back utilised on site for dust suppression or spread evenly along the lawns on site. No water may be discharged directly into the watercourse or down the front of the dune. This may result in erosion on site and/or the downstream beach environment. 				
	<p>c. Demolition activities becoming a nuisance to surrounding residents (dust, noise & vibrations).</p> <p><i>House Starr & House Emanuel</i></p>	Local	Short-term	Substantial	Very Likely	Low	<ul style="list-style-type: none"> Immediate neighbours must be notified prior to demolition work commencing. The use of explosives and blasting must be avoided, and manual or mechanical demolition alternatives utilised. Water suppression methods must be utilised to reduce and manage dust during demolition. Activity on site must be limited to normal construction industry working hours. All machinery and vehicles must be fitted with the appropriate noise muffling devices and must be maintained to ensure that vehicles do not produce excessive noise. Barriers / screens / fencing must be erected along 99 Colwyn Drive, at the back of the property, so that access to No. 101 Colwyn Drive is not restricted during demolition and the remainder of the construction phase. 	Moderate	Low	3	High

<p>2. Earthworks resulting in the infilling and excavation of material within 100m inland of the high-water mark of the sea during the expansion of infrastructure at 99 Colwyn Drive.</p>	<p>a. Soil erosion resulting in wash away down frontal dune and damage to adjacent coastal environment.</p> <p><i>House Starr & House Emanuel</i></p>	<p>Local</p>	<p>Short-term</p>	<p>Moderate</p>	<p>Likely</p>	<p>Low</p>	<p>As per section 9.0 of the Geotechnical Report, bulk earthworks have previously been carried out on site to create stepped platforms and the flat ground slope. Minimal earthworks are therefore anticipated to prepare the site for construction. Exposed soil and compaction may result in silt washing off the site, down the dune especially during rainfall events. The following measures must be put in place to reduce stormwater runoff and associated erosion damage:</p> <ul style="list-style-type: none"> • Vegetation must remain in place wherever possible and for as long as possible during earthworks. The geotechnical report notes that any cutting / removal of the grass may increase slope instability. • Sound management of surface water runoff from exposed sand surfaces must be put in place early in the construction phase. This must include the placement of sandbags and/or bidim in areas of preferential surface flow. • An earth berm (maximum of 900mm high) must be placed along the top edge of the platform where the bank starts to slope down towards the beach. • Should an area of erosion be noticed on site, this must be addressed immediately, and the area stabilised to prevent further erosion. • Cut embankments must be restricted to a slope batter of 1:2 (26°). • Should medium weathered diamictite or shale of the Dwyka Formation be exposed, slopes may be steepened to a maximum batter of 1:1 (45°), depending on joints and bedding orientation. • Any trench excavations / temporary cut embankments deeper than 1.2m must be suitably battered back or shored to prevent collapse. • In accordance with the NHBRC guidelines for geotechnical investigations, the site class 	<p>Low</p>	<p>Very Low</p>	<p>5</p>	<p>High</p>
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							<p>designation for the proposed new house with associated structures is P (Groundwater table) R - C2. The NHBRC foundation recommendations for this type of site class must be adhered to.</p> <ul style="list-style-type: none"> The houses and associated structures must be founded on ground beams spanning between the end bearing auger pile foundations. The end bearing piles must be socketed within an unweathered or slightly weathered diamictite bedrock. The following recommendations were made by the geologist for the foundations: <ul style="list-style-type: none"> Prior to pouring concrete, all foundation excavation inverts to be free of loose soil, Under no condition should conventional, strip foundations be placed within the very loose to loose clayey sands. To minimize the possibility of cracking due to differential foundation movement, brick force is to be placed in all brick courses in all foundation walls as well as in all courses above windows and doors. All stormwater run-off generated from hard surfaces on the site must be channelled, after suitable attenuation to pre-development stormwater flows, into the existing stormwater system. 				
	<p>b. Soil erosion resulting in material washing into the nearby watercourse reducing functionality.</p> <p><i>House Emanuel</i></p>	Site	Short-term	Moderate	Likely	Moderate	<p>In addition to the mitigation measures provided above, the following is applicable during the construction of House Emanuel:</p> <ul style="list-style-type: none"> A shade cloth / silt fence must be erected long the edge of the embankment which drops down to the natural spring / well (purple in Figure 12). This silt fence must be maintained throughout the construction period to ensure that it prevents silt and construction material from washing into the watercourse / well. 	Low	Very Low	4	High

							<ul style="list-style-type: none"> Should erosion of the embankment occur / excessive silt enter the watercourse, this is to be removed by hand and the disturbed area rehabilitated in collaboration with the ECO. 				
	<p>c. Heavy construction machinery and equipment working near the frontal dune.</p> <p><i>House Starr & House Emanuel</i></p>	Site	Short-term	Moderate	Unlikely	Low	<ul style="list-style-type: none"> A shade cloth fence must be erected across the front of the property where the bank slopes down to the beach (indicated in purple in Figure 12). The area seaward of the shade cloth must be treated as a No-Go area until such time as work commences on the beach access staircases. During the construction of new infrastructure on the existing platform, heavy construction machinery and equipment are not permitted near the front of the property where the bank starts to slope down to the beach (i.e. in front of the existing swimming pool). All construction machinery / equipment on site must be in good working order to ensure there are no leaks. 	Low	Very Low	5	High
	<p>d. Indirect impact on the adjacent beach environment.</p> <p><i>House Starr & House Emanuel</i></p>	Local	Short-term	Moderate	Very unlikely	Low	<ul style="list-style-type: none"> During excavations for the new swimming pools, all material must be stockpiled leeward of the swimming pool area to reduce the risk of excess sand / sediment from being blown / washed onto dune and / or beach environment. Any excess material excavated from site must either be: <ul style="list-style-type: none"> Removed from site completely; or Used as fill material on site behind the new houses (i.e. not near the front of the property where the bank slopes down to the beach). All cement mixing must take place on plastic sheets and must be contained to prevent cement / concrete from entering the dune and/or nearby beach environment. Prior to any work commencing on site, the applicant must appoint an independent Environmental Control Officer (ECO). 	Low	Very Low	5	High

						<ul style="list-style-type: none"> All Primary Contractors on site must undergo environmental induction training prior to work commencing (see Environmental Awareness Plan under section 5.0 of the EMPr). Environmental induction training must include: <ul style="list-style-type: none"> An indication of the location of the environmentally sensitive area, which includes the fore dune in front of the house and the location of the watercourse associated with House Emanuel. The importance of this environmentally sensitive area. Restrictions associated with this area. Contingency measures if the environmentally sensitive area is disturbed. General construction related impacts must be managed in accordance with the mitigation measures provided under section 4.3 of the EMPr. 				
<p>e. Disturbance / removal of protected <i>Mimusops caffra</i> (Milkwood) species.</p> <p>House Starr & House Emanuel</p>	Site	Long-term	Moderate	Likely	Moderate	<p>The location of the three <i>Mimusops caffra</i> (Milkwood) trees on the property are indicated in green in Figure 12. These trees are protected in terms of the National Forest Act (1998). A permit from DFFE is required prior to the cutting, removal or disturbance to these protected trees.</p> <ul style="list-style-type: none"> The two <i>Mimusops caffra</i> specimens located in the southern subdivision (i.e. House Emanuel) must be retained on the property. The <i>Mimusops caffra</i> specimen located on the northern subdivision may be removed however a permit from DFFE must be obtained prior to the removal of this protected tree species. Landscaping must be confined to the existing cut platform while the dune frontage and slopes be retained in a more natural form. An indigenous and appropriate (coastal dune species) planting palette must be employed on the property. 	Low	Very Low	3	High

	<p>f. Excavations destroying fossils impacting on palaeontology.</p> <p><i>House Starr & House Emanuel</i></p>	Regional	Long-term	Substantial	Extremely Unlikely	High	<p>The palaeontologist concluded that it is extremely unlikely that any fossils occur in the development footprint however, there is a small chance that fossils may occur in the mudstones of the Dwyka Group below ground. A Fossil Chance Find Protocol has therefore been provided under section 4.3 of the EMPr.</p> <ul style="list-style-type: none"> During earthworks, should any objects with historical, archaeological or cultural significance be uncovered, all work in this area must cease and the heritage authority, AMAFA, notified. 	Very Low	Very Low	5	Moderate
<p>3. Installation of the sewer pipeline along Colwyn Drive resulting in the excavation and infilling of material within 100m inland of the high-water mark of the sea (Technology Alt. 3).</p>	<p>a. Excavation of material and erosion impacting on coastal processes.</p> <p><i>House Starr & House Emanuel</i></p>	Local	Short-term	Moderate	Extremely Unlikely	Low	<p>All excavation activities associated with the installation of the new sewer pipeline will take place alongside Colwyn Drive. The nearest excavation will occur approximately 78m inland from the high-water mark with residential properties located in between the excavated trench and the high-water mark. All excavation therefore occurs well beyond the sand sharing system. To ensure that the trenches do not erode over time after heavy rains, the following applies:</p> <ul style="list-style-type: none"> Cleared areas may not be left exposed for long periods of time and must be re-vegetated as each stage of pipework is completed. Care must be taken to ensure that when closing trenches, soil is compacted sufficiently and left so that the level of the trench is slightly higher than the surrounding land, to allow settling. Should soil settle below the level of the surrounding land, it will leave a depression along which water will travel and this could create a focal point for erosion. 	Very Low	Very Low	5	High
	<p>b. Indirect impact on surrounding resident's access.</p> <p><i>House Starr & House Emanuel</i></p>	Site	Short-term	Moderate	Very Likely	Low	<ul style="list-style-type: none"> Access routes and other areas disturbed by construction infrastructure must be rehabilitated prior to the Contractor leaving the site. Access along Colwyn Drive must not be denied during the installation of the sewer pipeline and appropriate signage erected. 	Low	Very Low	5	High

							<ul style="list-style-type: none"> Trenches must not remain open indefinitely. Trench work must be completed in sections and then closed once the pipe has been laid in that section. Small inspection holes may be left open along the route but the rest of the trench must be closed. Trenches must not remain open during building shut down periods i.e. over Christmas and Easter. Trench work must be planned so that trenches are closed before these shut down periods. 				
4. Expansion of infrastructure by 581m ² within 100m inland of the high-water mark of the sea.	<p>a. New infrastructure negatively impacting coastal processes (i.e. the sand sharing system, biotic environment, sea-level rise and storm surges)¹⁵.</p> <p>House Starr & House Emanuel.</p>	Regional	Long-term	Substantial	Very Unlikely	Moderate	<p>The coastal specialist states that “<i>that present and proposed structures lying at an elevated and distal position from the shoreline, lie well beyond the sand sharing system and those areas of highest wave run up. The building of homesteads...is unlikely to elicit significant coastal or ecological impacts on the site and surrounds</i>”¹⁶. This is on condition that the following is adhered to in the design phase of the project:</p> <ul style="list-style-type: none"> Apart from the beach access staircases, all new infrastructure on site must be located above the 10m contour line (shown in Figure 12). The staircases leading down to the beach must be constructed out of woody / organic material and “floated” above ground to reduce the footprint. 	Low	Very Low	5	High
	<p>b. Incremental creep of infrastructure towards the sea.</p> <p>House Starr</p>	Site	Long-term	Slight	Very Likely	Low	<p>House Emanuel will fit largely in the existing house footprint with the proposed new swimming pool located a couple of meters leeward of the existing pool. There will therefore be no creep of infrastructure towards the sea on the southern subdivision. The existing house footprint will be expanded seaward by approximately 8m on the northern subdivision (House Starr). The new swimming pool is proposed in front of the new house, in line with the edge of House Emanuel’s</p>	Very Low	Very Low	4	High

¹⁵ Coastal processes identified in the “Best Practices for Coastal Development in KwaZulu-Natal” guideline that may be potentially impacted by coastal residential developments.

¹⁶ Section 7.0 of the SDP “Ecological Impact Assessment” July 2021.

							swimming pool. All infrastructure is located on the existing platform above the 10m contour line. <ul style="list-style-type: none"> The eastern edge of the swimming pools for House Emanuel and Starr provides the development setback line for the property. Any future development on site must take place leeward of this line. 				
5. Expansion of infrastructure by 216m ² within 32m of the natural spring / well. (Layout Alternative 2)	a. Construction activities encroaching down the embankment into the watercourse resulting in sedimentation and reduced functionality. <i>House Emanuel</i>	Site	Short-term	Substantial	Likely	Moderate	The natural spring / well lies lower than the surrounding ground level with a steep, loose material bank surrounding the watercourse. Earthworks must be carried out in accordance with the mitigation measures provided above for Impact 2b. Construction activities must be managed around the watercourse as follows: <ul style="list-style-type: none"> The distance between the watercourse and the existing development footprint must be maintained in the House Emanuel design (minimum distance of 6m as shown in Figure 12). The shade cloth / silt fence erected across the top of the embankment before it drops down to the watercourse must be maintained during the construction phase (indicated in purple in Figure 12). The embankment and watercourse must be treated as a No-Go area. Heavy construction machinery and equipment is not permitted near the shade cloth fence. Construction of the new garage wall near the embankment must be carried out by hand. No cement mixing to take place adjacent to the fence. This is to prevent spillage into the watercourse. The site camp and staff eating area must not be located in the north-western corner of the property. The existing property boundary fence running down the southern boundary must remain in place during construction to prevent staff and construction vehicles from unintentionally accessing the watercourse. 	Moderate	Low	4	Moderate

							<ul style="list-style-type: none"> No riparian vegetation must be cleared during the construction of House Emanuel¹⁷. 				
6. Establishment of beach access down the front of the dune.	<p>a. Change or loss of habitat associated with the clearance of indigenous dune vegetation from within the critically endangered Northern Coastal Grasslands ecosystem (SDP, 2021).</p> <p>House Starr and House Emanuel.</p>	Local	Long-term	Slight	Very Likely	Moderate	<p>As per the findings of the Ecological Impact Assessment, the dune vegetation is composed of “early seral dune vegetation, including <i>Gazania rigens</i> and <i>Carpobrotus dimidiatus</i>”. There were no species of conservation significance identified on the frontal dune. The loss of this vegetation is of negligible significance from a species diversity perspective however it is the stabilising function provided by the dune vegetation which needs to be prevented:</p> <ul style="list-style-type: none"> The installation of the staircases must only take place in winter and not the rainy season (i.e. May – Oct). No vegetation should actively be cleared during the installation of the new staircases thereby reducing the surface area of dune sand being exposed. All construction on the dune must take place by hand. General management measures must be implemented to avoid excessive excavation of the ‘dune-beach’ continuum, trampling and general restriction of activities to the construction footprint Only the minimal number of staff are permitted within the dune cordon. All staff working on the dune must have undergone environmental induction training so that the disturbance footprint is minimised. Only woody / organic material may be used for the staircases leading down to the beach (preferred staircase design attached under Appendix C). A stilted walkway has been designed to reduce the footprint. 	Very Low	Very Low	5	High

¹⁷ “Riparian habitat” is defined in the National Water Act (1998) as “the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas”.

							<ul style="list-style-type: none"> • Only one gate onto the beach is permitted (i.e. collated access point for House Starr and House Emanuel). • No infrastructure is permitted seaward of the existing fence. 				
	<p>b. Removal of existing concrete staircase down to the beach.</p> <p>House Starr</p>	Site	Short-term	Positive	Positive	Positive	<p>This is a positive impact associated with the project.</p> <ul style="list-style-type: none"> • The concrete strips / steps must be removed from the dune. • The natural gradient of the dune must be re-established using rakes. • All work taking place on the dune must be carried out by hand. • The affected area must be re-established to natural dune / cliff form. Indigenous dune vegetation must be replanted on the exposed sand surfaces. These species may include <i>Scaevola plumieri</i>, <i>Phylohydrax carnosus</i>, <i>Gazania rigens</i> and <i>Canavalia rosea</i> (all common to the vegetation type). • The planted dune vegetation composition must align with the established dune vegetation on adjacent properties. • The applicants are responsible for ensuring the long-term survival of the dune species. • Any emergence and spread of exotic species must be addressed through the implementation of the Alien Invasive Plants Eradication Management Plan (section 5.4.2. of the EMP). 	Very Low	Very Low	Positive	High
7. General construction-related impacts.	<p>a. Dust & emissions becoming a nuisance to surrounding residents.</p> <p>House Starr and House Emanuel</p>	Site	Short-term	Moderate	Very unlikely	Low	<p>This impact is unlikely considering the geology of the site, which is comprised on unconsolidated sand. Some dust may be generated during the construction of the house and therefore the following mitigation measures apply:</p> <ul style="list-style-type: none"> • During high winds, dust suppression must take place using water carts / hose to prevent excessive dust on site. • Any fine materials stockpiled on site must be covered to prevent dust from being blown around. 	Low	Very Low	5	High

							<ul style="list-style-type: none"> • Material transported to site on the back of trucks must be covered, • A complaints register must be maintained on site and any complaints received addressed timeously. • A shade cloth fence / other screening techniques must be used to reduce dust from entering neighbouring properties, where required. • All construction vehicles and equipment must be well maintained to reduce emissions generated on site. 				
	<p>b. Noise form construction machinery, equipment and staff becoming a nuisance to surrounding residents.</p> <p>House Starr and House Emanuel</p>	Site	Short-term	Moderate	Likely	Low	<p>The following measures are included in the EMPr to manage noise during construction:</p> <ul style="list-style-type: none"> • All construction vehicles and equipment must be well maintained to reduce noise on site. • All construction vehicles and equipment must be fitted with standard silencers. • No construction vehicles or machinery to operate outside of construction working hours (07:00 – 17:00). • Neighbours to be advised prior to work being done outside the above times. • A complaints register must be maintained on site and any complaints received addressed timeously. 	Low	Very Low	5	High
	<p>c. Littering and improper storage / disposal of waste accumulating on site or within the adjacent coastal environment or watercourse.</p> <p>House Starr and House Emanuel</p>	Site	Short-term	Moderate	Likely	Low	<p>The following measures are included in the EMPr to manage waste during construction so that it is contained within the development footprint and correctly disposed of:</p> <ul style="list-style-type: none"> • All waste generated on site must be disposed of in the designated waste management area to ensure that it is not blown around the site onto the beach, into the watercourse or into adjacent residential properties. • The waste management area must not be located at the edge of the platform where the dune drops down towards the beach. • The waste management area must not be located within 15m of the watercourse. 	Low	Very Low	5	High

							<ul style="list-style-type: none"> • All waste must be stored under cover to prevent rain ingress and/or waste from being blown around site. • No waste must be buried or burnt on site. • Potentially hazardous substance¹⁸ to be stored in a fenced off area that is undercover to prevent contamination of rainwater. • All potentially hazardous substances must be stored, in a bunded area (110% capacity of largest container) with an impermeable surface to prevent soil contamination during handling. • The use of hydrocarbons and other potentially hazardous liquids on site must be managed in accordance with section 4.3 of the EMPr. • No bulk storage of fuel is permitted on site (>30m³). • A full inventory of all hazardous materials must be retained on site with the respective Material Safety Data Sheets. 				
	<p>d. Improper placement and management of toilet facilities potentially impacting the coastal environment and becoming a nuisance to surrounding residents.</p> <p>House Starr and House Emanuel</p>	Site	Short-term	Moderate	Unlikely	Low	<p>Sufficient toilet facilities must be provided on site to prevent construction staff from utilising the surrounding areas.</p> <ul style="list-style-type: none"> • On-site toilets will be provided for domestic purposes during construction phase (chemical or connected to municipal sewerage pipeline). • Toilets must be located within the property boundaries. • Toilets must not be located near the fore dune in front of the house or within 15m of the watercourse. • Staff must use the toilets provided and must not use any other areas on site as toilet facilities. • Toilets should be screened from the neighbours as far as is practically possible. • Ablution facilities must be checked regularly and kept in a clean state. 	Low	Very Low	5	High

¹⁸ Hazardous substances refer to substances scheduled in the Hazardous Substances Act (1973) and Hazardous Chemical Substances Regulations (1995) and include paint, oils, fuels, solvents, pesticides.

<p>e. Greywater / hydrocarbons / chemicals storage and use on site having the potential to pollute the adjacent beach environment or nearby watercourse.</p> <p>House Starr and House Emanuel</p>	<p>Local</p> <p>Short-term</p> <p>Moderate</p> <p>Unlikely</p> <p>Low</p>	<p>Local</p> <p>Short-term</p> <p>Moderate</p> <p>Unlikely</p> <p>Low</p>	<p>Local</p> <p>Short-term</p> <p>Moderate</p> <p>Unlikely</p> <p>Low</p>	<p>During construction, minor spills of material, particularly hydrocarbons, may occur. This will pose a localised threat the immediate environment. This impact can be prevented by ensuring the mitigation measures provided above for waste management are adhered to. If a spill does occur, every effort must be made to prevent the spill from washing off site into the surrounding environment.</p> <ul style="list-style-type: none"> Any spills on site must be cleaned up immediately using the Spill Response Procedure provided in section 5.4.1 of the EMPr. The seven step Spill Response Procedure must be included in the ECO's environmental toolbox talk. No vehicles or equipment must be washed on site. Drip trays must be available near the hazardous storage area and where hazardous materials are being used on the site. A Spill Kit / similar must be available near the hazardous storage area. 	<p>Low</p>	<p>Very Low</p>	<p>5</p>	<p>Moderate</p>
<p>f. Proliferation of exotic species on site and within adjacent dune environment.</p> <p>House Starr and House Emanuel</p>	<p>Local</p> <p>Medium-term</p> <p>Substantial</p> <p>Very Likely</p> <p>Low</p>	<p>Local</p> <p>Medium-term</p> <p>Substantial</p> <p>Very Likely</p> <p>Low</p>	<p>Local</p> <p>Medium-term</p> <p>Substantial</p> <p>Very Likely</p> <p>Low</p>	<p>Construction activities, primarily vegetation clearance, typically provides an opportunity for the proliferation of exotic species within the disturbed area. The establishment and spread of alien invasive species within the disturbance footprint must be managed throughout the construction phase by the Contractor.</p> <ul style="list-style-type: none"> The "Eradication of Alien Invasive Plant" Management Plan must be implemented on site during construction (section 5.4.2 of the EMPr). This Management Plan includes a list of common alien invasive plant species anticipated on site, identification photographs and eradication measures. Alien invasive species must not be permitted to establish on site or on the fore dune. 	<p>Moderate</p>	<p>Very Low</p>	<p>4</p>	<p>High</p>

OPERATION

8. Expansion of residential infrastructure at 99 Colwyn Drive.	<p>a. Climate change and rising sea levels having a medium to long-term impact on infrastructure on site.</p> <p>House Starr and House Emanuel</p>	Site	Long-term	Substantial	Unlikely	Low	<p>Climate change is anticipated to include a rise in sea level as well as an increase in severe storm events¹⁹. An approximate maximum increase in sea level of 0.8m is expected over the next 25 years.</p> <ul style="list-style-type: none"> • Provided that all residential infrastructure remains on the existing platform, the property is elevated enough to accommodate the anticipated sea level rise. • The installation of the staircases down the front of the dune must be constructed in accordance with the mitigation measures provided in the attached EMPr reducing the erosion risk of rising sea levels and severe storm events. 	Moderate	Low	5	Moderate
	<p>b. Placement of the staircases down the dune within the shoreline interrupting sediment transport regime (SDP, 2021).</p> <p>House Starr and House Emanuel</p>	Local	Long-term	Substantial	Unlikely	Moderate	<p>As per the SDP Ecological Impact Assessment, there is no intrusion into the sand sharing system by built structures other than the staircases down the front of the dune. Minor sediment mobilisation at the point of excavation.</p> <ul style="list-style-type: none"> • Mitigation measures have been included under Impact 6a above to ensure that the dune slope remains stable during the installation of the staircase. • The design of the timber staircases (Appendix C) allows for dune vegetation to grow underneath the staircase and therefore the staircases will have no impact on the sediment transport regime associated with the coastal environment. • It is the responsibility of the landowner to ensure that dune vegetation re-establishes where it has been disturbed during construction and managed in the long-term. • As stated above, species common to the Subtropical Seashore vegetation type must be maintained on the dune in line with established 	Moderate	Low	4	Moderate

¹⁹ Bundy, S., Goble, B., Parak, O. and Bodasing, M. "Best Practises for Coastal Development in KwaZulu-Natal" KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, Pietermaritzburg (2021).

							dune vegetation on the neighbouring properties.				
	<p>c. Increase in hard surfaces resulting in a change in the hydrology (SDP, 2021). This has the potential for higher velocity stormwater runoff onto the beach, dune environment and watercourse. A change in hydrology also has the potential to alter the plant community within the frontal dune and more distal cliff form.</p> <p>House Starr and House Emanuel</p>	Local	Long-term	Moderate	Likely	Low	<p>A change in the plant community within the frontal dune and distal cliff from may be brought about by changes in the availability of water and chemistry. While plant communities may alter to accommodate such change, invertebrates, such as coastal amphipods and isopods (Crustacea), noted from the seeps in this region may also be affected, with possible impacts on such communities. The significance of this impact has been reduced using the preferred Technology Alternative for offsite sewage disposal.</p> <ul style="list-style-type: none"> Rainwater must be allowed to percolate on site underneath any decking. This is to promote stormwater infiltration and groundwater recharge. All stormwater must be attenuated on site and must not be discharged out the front of the property. <p>As recommended by the geotechnical engineer:</p> <ul style="list-style-type: none"> All stormwater run-off from the new infrastructure proposed on site must be channelled, after suitable attenuation to pre-development stormwater flows, into the existing stormwater system. 	Low	Very Low	5	High
CUMULATIVE											
9. Expansion of residential infrastructure & establishment of staircases down the front of the dune at 99 Colwyn Drive.	<p>a. Cumulative impact on the sand sharing system in Sheffield Beach, including changes to the coastal fauna and faunal ethos (SDP, 2021).</p> <p>House Starr and House Emanuel</p>	Regional	Long-term	Substantial	Unlikely	Moderate	<p>The alteration of the sand sharing system in this area is an existing impact which arose during the 1990's with the development of the area into an urban complex. All existing and proposed residential infrastructure at 99 Colwyn Drive "<i>lies well beyond the sand sharing system and those areas of highest wave run up</i>"²⁰.</p> <ul style="list-style-type: none"> The use of external lighting should be confined to areas around the built structures. 	Moderate	Very Low	5	High

²⁰ Section 6.1 of the SDP "Ecological Impact Assessment" (July 2021).

								Specifically, no spotlights must be directed onto the beach. Apart from the impact management actions listed in the table above and included in the EMP, no other additional mitigation measures were prescribed by the coastal specialist.				
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Table 7: Assessment of Impacts Associated with the Alternate House Emanuel Layout and Sewage Technology Alternatives for the Expansion of Infrastructure at 99 Colwyn Drive (Layout Alternative 1 and Technology Alternatives 1 & 2).

Aspect	Impact	Extent	Duration	Severity	Probability	Irreplaceability	Mitigation	Significance of Impact (Severity x Probability)		Ranking of residual impacts	Degree of Certainty
								Without mitigation	With Mitigation (residual impact)		
CONSTRUCTION											
1. Demolition of infrastructure at 99 Colwyn Drive.	This aspect of the project, associated impacts, mitigation measures and significance of impacts provided above for the preferred Layout and Technology Alternative remains the same for Layout Alt 2 and Technology Alternative 2 & 3.										
2. Earthworks resulting in the infilling and excavation of material within 100m inland of the high-water mark of the sea during the expansion of infrastructure at 99 Colwyn Drive.	a. Soil erosion resulting in wash away down frontal dune and damage to adjacent coastal environment. <i>House Starr & House Emanuel</i>	This impact, mitigation measures and significance of impacts provided above for the preferred Layout and Technology Alternative remains the same for Layout Alt 2 and Technology Alternative 2 & 3.									
	b. Soil erosion resulting in material washing into the nearby watercourse reducing functionality. <i>House Emanuel</i>	Site	Short-term	Substantial	Very Likely	Moderate	The western wall of the garage in Layout Alternative 1 is located right on the edge of the embankment which drops down to the watercourse. The severity and probability of the impact occurring is therefore increased. <ul style="list-style-type: none"> The same mitigation measures would apply to Layout Alternative 1 however a shade cloth / silt fence will not be feasible. Construction must take place from east to west with workers remaining within the confines of 	Moderate	Moderate	3	High

							the development footprint and not accessible the garage wall from the western side.				
	<p>c. Heavy construction machinery and equipment working near the frontal dune.</p> <p><i>House Starr & House Emanuel</i></p>	<p>These impacts, mitigation measures and significance of impacts provided above for the preferred Layout and Technology Alternative remains the same for Layout Alt 2 and Technology Alternative 2 & 3.</p>									
	<p>d. Indirect impact on the adjacent beach environment.</p> <p><i>House Starr & House Emanuel</i></p>										
	<p>e. Disturbance / removal of protected <i>Mimusops caffra</i> (Milkwood) species.</p> <p><i>House Starr & House Emanuel</i></p>										
	<p>f. Excavations destroying fossils impacting on palaeontology.</p> <p><i>House Starr & House Emanuel</i></p>										
3. Expansion of infrastructure by 581m ² within 100m inland of the high-water mark of the sea.	<p>This aspect of the project, associated impacts, mitigation measures and significance of impacts provided above for the preferred Layout and Technology Alternative remains the same for Layout Alt 2 and Technology Alternative 2 & 3.</p>										

<p>4. Expansion of infrastructure by 256m² within 32m of the natural spring / well. (Layout Alternative 1)</p>	<p>a. Construction activities encroaching down the embankment into the watercourse resulting in sedimentation and reduced functionality. <i>House Emanuel</i></p>	<p>Site</p>	<p>Short-term</p>	<p>Severe</p>	<p>Very Likely</p>	<p>Moderate</p>	<p>As described above, the location of the western wall of the garage in Layout Alternative 1 increases the severity and probability of the impact occurring.</p> <ul style="list-style-type: none"> The same mitigation measures would apply to Layout Alternative 1 however a shade cloth / silt fence will not be feasible. Construction must take place from east to west with workers remaining within the confines of the development footprint and not accessible the garage wall from the western side. 	<p>High</p>	<p>Moderate</p>	<p>3</p>	<p>Moderate</p>
<p>5. Establishment of beach access down the front of the dune.</p>	<p>This aspect of the project, associated impacts, mitigation measures and significance of impacts provided above for the preferred Layout and Technology Alternative remains the same for Layout Alt 2 and Technology Alternative 2 & 3.</p>										
<p>6. General construction-related impacts.</p>	<p>This aspect of the project, associated impacts, mitigation measures and significance of impacts provided above for the preferred Layout and Technology Alternative remains the same for Layout Alt 2 and Technology Alternative 2 & 3.</p>										
<p>OPERATION</p>											
<p>7. Expansion of residential infrastructure at 99 Colwyn Drive.</p>	<p>a. Climate change and rising sea levels having a medium to long-term impact on infrastructure on site. <i>House Starr and House Emanuel</i> b. Placement of the staircases down the dune within the shoreline interrupting sediment transport regime (SDP, 2021). <i>House Starr and House Emanuel</i></p>	<p>These impacts, mitigation measures and significance of impacts provided above for the preferred Layout and Technology Alternative remains the same for Layout Alt 2 and Technology Alternative 2 & 3.</p>									

	<p>c. Increase in hard surfaces resulting in a change in the hydrology (SDP, 2021). This has the potential for higher velocity stormwater runoff onto the beach, dune environment and watercourse. A change in hydrology also has the potential to alter the plant community within the frontal dune and more distal cliff form.</p> <p>House Starr and House Emanuel</p>	Local	Long-term	Substantial	Very Likely	Low	<p>The minor increase in hard surfaces associated with the expansion of infrastructure on the property remains the same however this impact will be amplified with the establishment and use of additional septic tanks to dispose of sewage on site. The available area for evapotranspiration has been decreased with the expansion of infrastructure on the site and therefore the use of septic tanks was not recommended by the engineer. A split system is feasible (septic tank and conservancy) however the preferred Technology Alternative, to connect to the location sewer reticulation network is the preferred. The use of septic tanks may serve to alter the surface and sub-surface flow of water resulting in water leaching out of the dune during heavy rainfall.</p> <ul style="list-style-type: none"> • If a split system is used on site, a more detailed investigation must be carried out to determine groundwater percolation rates and the required evapotranspiration area. • Septic tanks must be placed distantly from the stream and beach, as shown indicated in Figure 11 below. • Septic tanks must not be placed proximal to the seaward edge (cliff face) of the property. • The option to modify the surface soils around the septic tanks, as well as ameliorate the edaphic and vegetative state around the tanks must be considered to improve the biochemical remediation of discharged wastewater. 	Moderate	Low	4	Moderate
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Figure 11: Image Indicating the Recommended Location For Septic Tanks (Source: SDP, 2021).



CUMULATIVE

8. Expansion of residential infrastructure & establishment of staircases down the front of the dune at 99 Colwyn Drive.

This aspect of the project, associated impacts, mitigation measures and significance of impacts provided above for the preferred Layout and Technology Alternative remains the same for Layout Alt 2 and Technology Alternative 2 & 3.

7.0 ENVIRONMENTAL IMPACT STATEMENT

7.1 SUMMARY OF KEY FINDINGS (POSITIVE AND NEGATIVE IMPACTS)

The expansion of infrastructure will take place at 99 Colwyn Drive, which is located within 100m of the high-water mark of the Indian Ocean and within 32m of a watercourse. The property is located within an existing urban environment and is therefore, already highly developed and transformed. Two sensitive environmental features have been identified; the coastal environment and sand sharing system associated with the nearby shoreline and the natural drainage feature which is near to House Emanuel, located on the southern subdivision.

Using the 2007 storm event as a baseline, the coastal specialist confirmed that the expansion of infrastructure proposed for both House Emanuel and Starr will have no intrusion into the coastal sand sharing system due to the elevation of the property and the placement of the infrastructure above the 10m contour line. The preferred layout for House Emanuel takes cognisance of the fresh water well, located in the north-western corner of the property. All construction activity must take place in accordance with the attached EMPr to ensure that the significance of all impacts identified is reduced to “low” or “very low”.

The following provides a summary of the key findings of the assessment:

- The most notable impact to mitigate and manage is the potential for new infrastructure to alter or influence coastal processes and the sand sharing system associated with Christmas Bay.
- On receipt of the Ecological Impact Assessment, it was concluded that the expansion of new infrastructure on the existing platform would have “*little to no intrusion into the coastal sharing system*” as all new residential infrastructure will be above the 10m contour line.
- Despite the proposed subdivision of the property into two; one access point onto the beach has been retained. The existing concrete staircase will be removed, and two floating timber staircases constructed down the dune to service each household. The design of the new staircases is preferable compared to the existing staircase.
- The distance between residential infrastructure and the watercourse has been maintained in the preferred layout with House Emanuel’s garage remaining within the existing footprint.
- The preferred Technology Alternative is for the houses to be connected to the local sewer reticulation network. The move away from onsite sewage disposal is a positive impact associated with the project.

7.2 ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

The information in this report has been extracted from the various specialist reports attached under Appendix B. The assessment assumes that information received from the specialist team, architect and applicants is accurate. Assumptions and limitations of the specialist reports are listed under section 2.0 of the SDP “*Ecological Impact Assessment*” July 2021 and section 5.0 of the “*Palaeontological Impact Assessment*”.

7.3 IMPACT MANAGEMENT OUTCOMES

Through the assessment process, impact management outcomes have been identified and are provided in the table below. Impact management measures and recommendations identified during the assessment have been included in the EMPr attached under Appendix E to ensure that the impact management outcome is achieved.

Table 8: Impact Management Outcomes Associated with the Expansion of Infrastructure at 99 Colwyn Drive.

Primary Impact Management Outcome: <i>To create a sustainable development by preventing construction activities from impacting the sand sharing system and nearby watercourse.</i>		
#	Impact Management Outcome	Measures in Place to Achieve Outcome
1	To avoid unnecessary encroachment of construction activities into the sand sharing system.	An independent ECO must clearly demarcate the No Go area in the front of the property before the gradients drops down towards the beach. Only designated staff, who have received the necessary environmental induction training may enter this No Go area during the construction of the staircases and removal of the existing concrete staircase. Measures to prevent and manage encroachment into the dune / coastal environment have been included under section 4.3 of the EMPr.

3	To avoid unnecessary disturbance (direct or indirect) to the freshwater spring, which is used by local residents as a water supply.	The preferred Layout Alternative 2 for House Emanuel must be authorised and the 6m watercourse buffer retained during construction. The steep embankment which drops down to the watercourse must be clearly demarcated and treated as a No Go area. All work must be monitored daily by the ECO to avoid unnecessary disturbance. Other measures to prevent and manage construction in this sensitive area have been included under section 4.3 of the EMPr.
4	Ensure dune stability during the construction of the floating wooden staircases down to the beach.	Only designated staff, who have received the necessary environmental induction training may enter this No Go area during the construction of the staircases and removal of the existing concrete staircase. No vegetation must be cleared. Measures to manage construction have been included under section 4.3 of the EMPr.
5	Connection to the local sewer reticulation network preventing the need for onsite sewage disposal and subsurface flow of wastewater down the dune front.	The preferred alternative for sewerage disposal is the construction of a 75mm sewer pipeline along Colwyn Drive to connect the houses to the local sewer reticulation network. A split system between conservancy tanks and septic tanks may be required. If this alternative takes place, recommendations provided by the coastal specialist have been included under section 4.1 of the EMPr.

7.4 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The expansion of infrastructure at 99 Colwyn Drive is likely to commence within the next 5 years and therefore the EA must be valid until 2027. A post-construction audit must be undertaken by an independent ECO and the report submitted to EDTEA: Compliance and Enforcement.

7.5 MONITORING REQUIREMENTS

An independent ECO must be appointed by the applicant to monitor the development in accordance with the EMPr attached under Appendix E.

- Each applicant will be responsible for ensuring compliance on their respective properties during the construction of the new homes (i.e. Rob Emanuel will be responsible for all construction activity on proposed Portion 780 (of 292) of Farm Lot 61 No. 1521, the southern subdivision and Michael Starr will be responsible for construction activity on proposed Remainder of Portion 292 of Farm Lot 61 No. 1521).
- The ECO must, prior to any work commencing on site, conduct Environmental Awareness training with site personnel (as per section 5.0 of the EMPr).
- The ECO must undertake monthly audits during the expansion of residential infrastructure on site.
- One monthly report summarising the findings of the audits must be submitted to the applicant, Contractor and EDTEA: Compliance and Enforcement.
- One post-construction audit must be undertaken when construction is complete.

7.6 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD BE AUTHORISED AND CONDITIONS OF AUTHORISATION

Based on the outcome of this assessment, it is recommended that the expansion of infrastructure at 99 Colwyn Drive, (Layout Alternative 2; Technology Alternative 3), be authorised by EDTEA. Mitigation measures provided in the attached EMPr must be strictly adhered to during construction. All staff working on site must be made aware of the sensitive coastal environment at the onset of construction (Figure 12). After mitigation, the significance of all impacts associated with the layout have “low” to “very low” significance.

As indicated by the coastal specialist, all infrastructure is located on an existing, transformed portion of coastline. The results of the coastal assessment indicate that the proposed activities “will elicit minimal environmental impacts, provided that suitable mitigation measures are imposed”. Measures have been included in the attached EMPr to ensure that the impact management outcomes listed in the table above are achieved. It is therefore the reasoned opinion of the EAP that the expansion of infrastructure at 99 Colwyn Drive (Layout Alt 2, Technology Alt 1) be authorised by EDTEA.

The following conditions are recommended for inclusion in the Environmental Authorisation:

- The EMPr attached under Appendix E must be adhered to during all phases of the project.
- The ECO must undertake monthly audits during the expansion of residential infrastructure on site.
- Two shade cloth / silt fences must be established prior to demolition activities commencing on the property (indicated in Figure 12).
- Environmental Awareness training must take place in accordance with section 5.0 of the EMPr to ensure that all Contractors working on site are aware of the restrictions associated with the environmentally sensitive areas.
- An earth berm (maximum of 900mm high) must be placed along the top edge of the platform where the bank starts to slope down towards the beach.
- Sound management of surface water runoff from the site must be put in place early in the construction phase to avoid any surface flow of water onto the dune.
- All new infrastructure except for the staircases must be constructed above the 10m contour line (i.e. outside of the sand sharing system).
- The distance between the watercourse and the existing development footprint must be maintained in the House Emanuel design (minimum distance of 6m as shown in Figure 12).
- The staircases down the dune must be constructed out of woody / organic material and the footprint minimised.
- One, collated beach access point is permit for both House Starr and House Emanuel.
- The old concrete staircase down the front of the dune must be removed and the disturbed dune vegetation rehabilitated.
- A permit from DFFE must be obtained prior to the clearance of the *Mimusops caffra* specie on the northern subdivision. The two other *Mimusops caffra* trees must be retained on the southern subdivision.

Figure 12: Location of House Emanuel (South) and House Starr (North) at 99 Colwyn Drive Showing Sensitive Environmental Areas to be Avoided During Construction.

