

TAURARUA JUDGES BAY; STORMWATER MANAGEMENT AND LOW IMPACT DESIGN

Bronwyn Rhynd, Stormwater Solutions Consulting Ltd

ABSTRACT

Taurarua Judges Bay is an urban park located in Judges Bay, Parnell, close to Auckland CBD with views of the Bay, Tamaki Drive, Auckland Harbour and Rangitoto Island.

The upgrade of the park and beach front of the Bay was a project run by Auckland Council Parks Department with the design undertaken in a collaborative approach utilising the skills of a variety of consultants. The key aims of the project were to create a high quality park which has multiple uses including an all tides swimming spot and a quality leisure destination. It incorporates interpretive representation of a rich cultural and natural history to celebrate this "Inner City Jewel"

Water Quality was a key driving force for the success of the Judges Bay project both for an all-tides swimming destination and ongoing ecological values of the Bay.

The design of the upgrade of the stormwater network incorporated low impact elements and sustainability values for treatment of the stormwater from the catchment prior to discharge to the bay. This design process also included the integration of sustainability values with respect to the cultural, social, physical and natural elements. These elements were incorporated into the project as the building blocks to the stormwater design process.

The consultants' aim for the project was to provide a sustainable outcome for the bay and surrounding parkland that was understood and embraced by the long term owner, Auckland Council, and users of the stormwater management system.

This paper will outline the project from design through to construction and finish with the feedback from the public with respect to the utilisation of the park

KEYWORDS

Low impact design, sustainable values, stormwater management design, collaboration

PRESENTER PROFILE

Bronwyn Rhynd is an environmental engineer and managing director of Stormwater Solutions Consulting Ltd with a wide range of experience over the last 15 years of designing and supervising the installation of stormwater management systems, including low impact and innovative solutions for the built environment. She has experience in resource consenting from the application (to consenting authorities) through to expert witness for hearings on various projects involving stormwater management and best practice issues. She has undertaken several projects where collaboration with various project disciplines has resulted in award winning outcomes.

1 INTRODUCTION

Taurarua Judges Bay is an urban park located in Judges Bay, Parnell, close to Auckland CBD with views of the Bay, Tamaki Drive, Auckland Harbour and Rangitoto Island. The Auckland Council project for upgrade of the park and beach front of the Bay was a project undertaken in a collaborative approach utilising the skills of a variety of consultants. The key aims of the project were to create a high quality park which has multiple uses including an all tides swimming spot and a quality leisure destination. It incorporates interpretive representation of a rich cultural and natural history to celebrate this “Inner City Jewel”

Water Quality was a key driving force for the success of the Judges Bay project both for an all-tides swimming destination and ongoing ecological values of the Bay. Therefore the stormwater management, including the upgrade of the stormwater network incorporated low impact elements and sustainability values for treatment of the stormwater from the catchment prior to discharge to the bay. The integration of sustainability values with respect to the cultural, social, physical and natural elements into the design provided solid building blocks to the stormwater design process.

The consultants’ aim for the project was to provide a sustainable outcome for the bay and surrounding parkland that was understood and embraced by the long term owner, Auckland Council, and users of the stormwater management system.



Photo 1 : Inner City Jewel - Taurarua Judges Bay

2 PROJECT OVERVIEW

This project was undertaken in 2 stages. The first was undertaken in 2009 which included the removal of sediments from the tidal lagoon, reinstatement and replenishment of sand to the bay to create and extend an all tides swimming beach.

The second stage was the beachfront and foreshore park upgrades which included the reconfiguration of the roads and parking layout, park environment and stormwater infrastructure to improve the water quality of the bay. This stage also included the improvements to the physical elements such as pedestrian passage, toilet and changing facilities and legibility around the pedestrian and vehicle movements in the park.

The main aims of the project was to create an all-tide beach which will become a quality open space destination, address the water quality issues and improve the connections between the bay and other parks of Auckland's historic and beautiful open space network. Included in this was to embrace and respect the history and culture of the bay and create an opportunity for visitors to inhabit and enjoy the open space. The project sought to identify, preserve, interpret and celebrate the landscape features, cultural associations, ecology and stories of Taurarua Judges Bay.

Stormwater management plays a part of the overall project from organisational alignment through to meeting the project objectives. These elements are discussed in the following sub sections.

2.1 ORGANISATIONAL ALIGNMENT

As part of the project there was always the sense of meeting the objectives of the project that is to be considered. This is to be considered through all the stages, not just at the completion. The aspiration of Auckland Council's parks department was to protect the unique features of the coastal environment and enhance this within the development of Taurarua Judges Bay which can benefit the local community as well as the wider community and visitors to the region.

This project was consistent with the former Auckland Council's Open Space Framework of "Our collective Taonga: Places for people, Places for Nature." This vision formed the basis of the design to transform the built form and create an exemplar project for Auckland's park network which will have a standing on the world stage.

2.2 MEET BUDGETS AND TIMELINES

This project was delivered on time and within the allocated budget that was set out in the initial project planning documentation. The project was opened to the public in December 2011 which was in time for the Christmas summer holidays.

Each of the milestones were signed off by the Auckland Council project leader, Iwi and local board to ensure that the project meet the fiscal objectives.

3 STORMWATER MANAGEMENT DESIGN

3.1 THE DESIGN PROCESS

The stormwater management design process for this project started well before any calculation sheets, excel spreadsheets or hydrological information was utilized. It was important to understand the philosophy behind the project and the collaboration between consultants and partners was imperative, therefore a site walkover was established to

provide an understanding of the desired outcomes and the importance of all individual parts to ensure that, to quote Aristotle, "The whole is greater than the sum of its parts".

Community and stakeholder engagement was a large part of the design process. The idea for the project was put forward by the Parnell Community committee to the council. Prior to this the project was not part of (or endorsed) by the master planning of the area. Therefore the community committee was actively engaged in the project throughout the entire life of the project. Considerable consultation was carried out with the stakeholders, which included Iwi, adjacent residents and local community groups, via a series of workshops and open days in order to inform the design and deliverables of the project.

This approach led to the engagement of the various outcomes into the stormwater management design. It was important to bring these elements into the design to have devices which were then "owned" by the stakeholders.

Collaboration with the various disciplines was a unique approach to establishing the design criteria for the project, along with the initial brief from the client. Although there was engineering design the inputs from the other disciplines meant that the traditional engineering design had an opportunity to extend beyond the "calculations" and lateral thinking applied. The result was that the calculations supported the lateral thinking to become an innovative outcome for stormwater design.

The design received approval for engineering construction based on the application of best practice, however there was always the construction element that then tests the design. During construction of this project there was the need for a few alterations to ensure that the site issues and constraints could still achieve the desired outcomes of the project. Hence small alterations were necessary to adjust sizes of devices, location changes and the inevitable services that were not shown on the plans that need to be accommodated.

3.2 SUSTAINABILITY ACROSS ENVIRONMENTAL, SOCIAL AND CULTURAL ECONOMIC AREAS

Environmental, social, cultural and economic sustainability principles were core values in the design and delivery of this project. Sustainability was applied across all levels of design and disciplines that were involved in the project, which included the stormwater management design process from the inception through to construction of the devices within the overall infrastructure element.

The site's rich and varied cultural heritage and archeology was preserved through the use of a variety of techniques. With respect to stormwater management the excavation of the embankments to provide for infrastructure was a design constraint. The archeological findings and also preservation of a significant tree implemented bespoke design of the treatment approach for the runoff from the road reserve. Minimization of excavation was paramount which resulted in wetland swales which were designed to accommodate the historic and archeological features.

The removal of suspended solids from the runoff prior to discharge provides sustainable outcomes in many aspects of sustainable elements. This reduced the amount of sediments and silts entering the bay and pollution levels of heavy metals were reduced on a long term sustainable basis.

All phases of the project were competitively tendered, ensuring a "value for money" outcome for the client and community.

3.3 INTERESTING INFORMATION AND DESIGN ELEMENTS OF THE PROJECT

Meeting the project team to align the objectives was the first step in the approach to the design of stormwater management. This ensured that everyone understood each disciplines objectives and constraints then integrating each of these aspects, where possible, into the various project elements. One of the first tests for the stormwater management design was to incorporate the urban design desire for a stormwater pond within the upper portion/extent of the project. Based on good engineering practice the first step was to question the pond's viability as its catchment area would extend beyond the project extents. Then challenge the reasoning of this element as it would be perched above the project at the head of the surface water treatment train, where historically and naturally this would not exist.

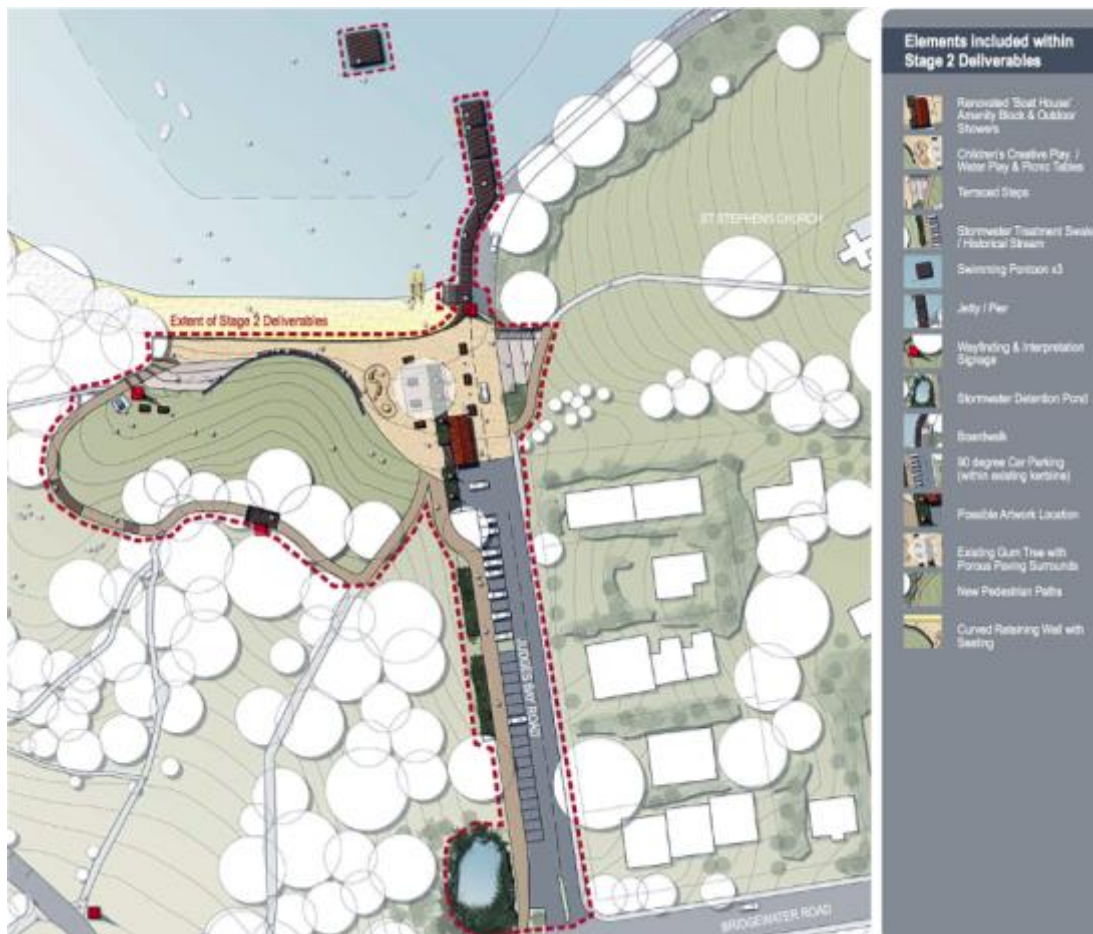


Figure 1: Initial design concept

The next step was to observe how the park was used to form a stable approach to stormwater management design. The area assigned to the stormwater pond was actually utilised for a picnic area by park visitors as it was the surface was an open area and elevated for a great view of the bay. Constructing a pond in this location would remove this passive recreational area for the park visitors and community therefore this observation led to proposing an alternative treatment approach for the upper catchment that didn't have large footprint. The stepped raingarden approach resulted in responding to the park utilization, as well as the change in contour, to ensure the footprint was minimised in this location and clear area maximized for park visitor utilization.

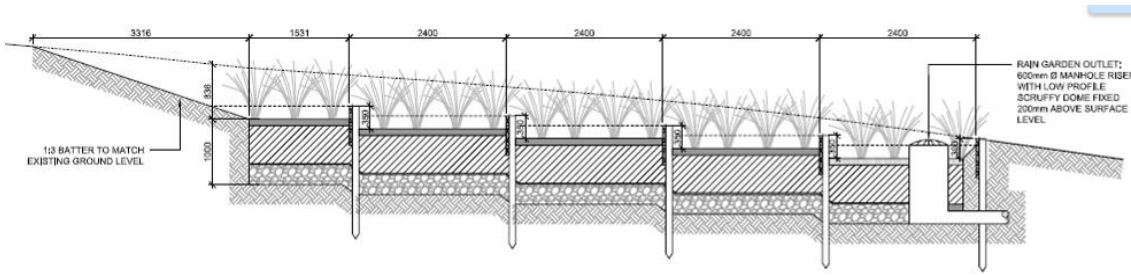


Figure 2: Stepped Raingarden

Historic research highlighted the stream that used to be located where the road carriageway is at present for Judges Bay Road. The stormwater device choice in this location was an opportunity to recreate the sense of the stream. Therefore the treatment swales are a reflection on the historic stream by receiving the surface water from the road catchment to the swale to activate a stream like environment for both conveyance and treatment.



Figure 3: Historical view of Judges Bay

Reducing the risk of erosion to the beach which will scour away the replenished beach was a very important element for the client. The utilization of the beachfront boardwalk and pavement provided a challenge for the design to incorporate the conveyance capacity whilst not creating a hazard for the park visitors. This led to the implementation of a shallow dish drain supported by a slot drain that has a hardy grating, as the best practical solution in this instance.

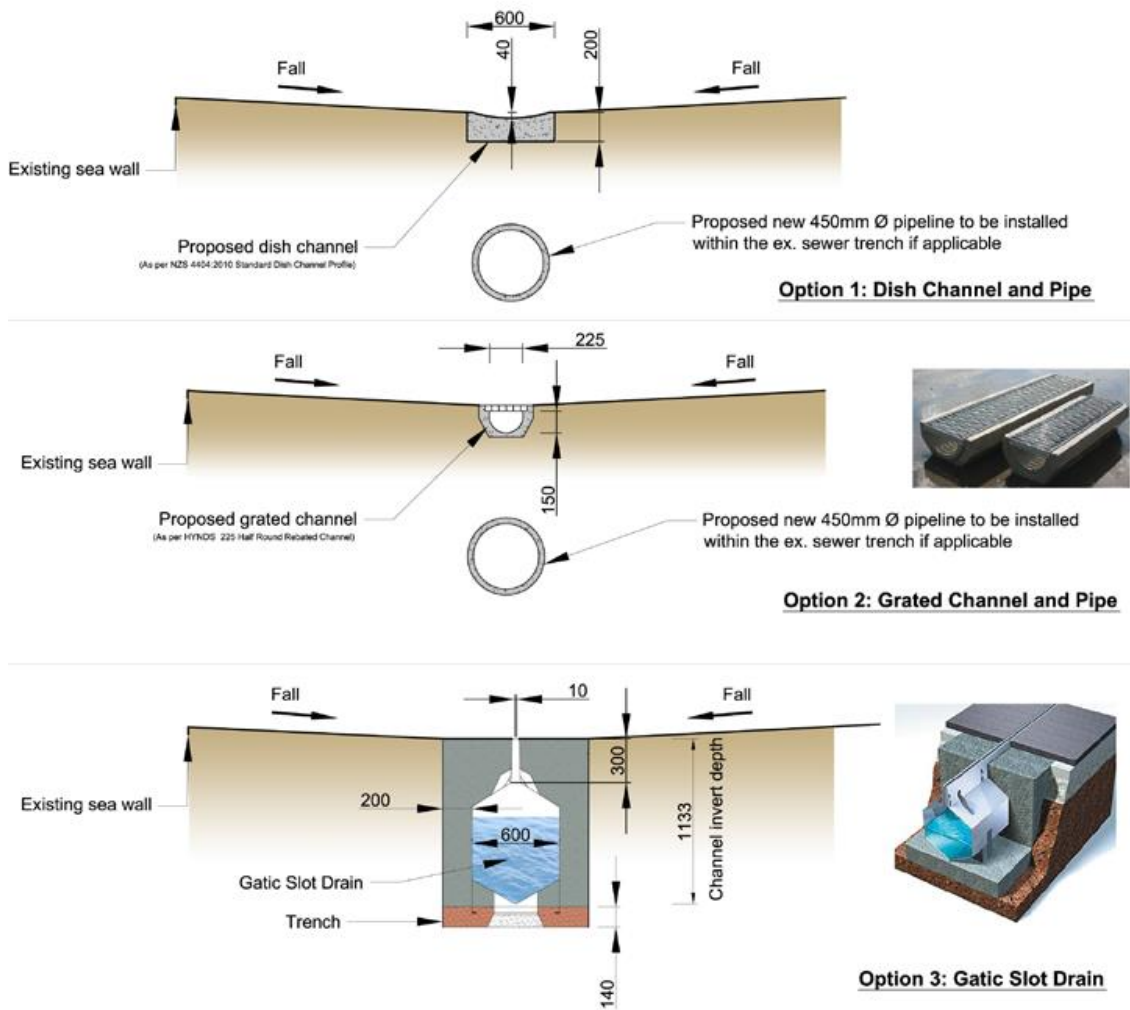


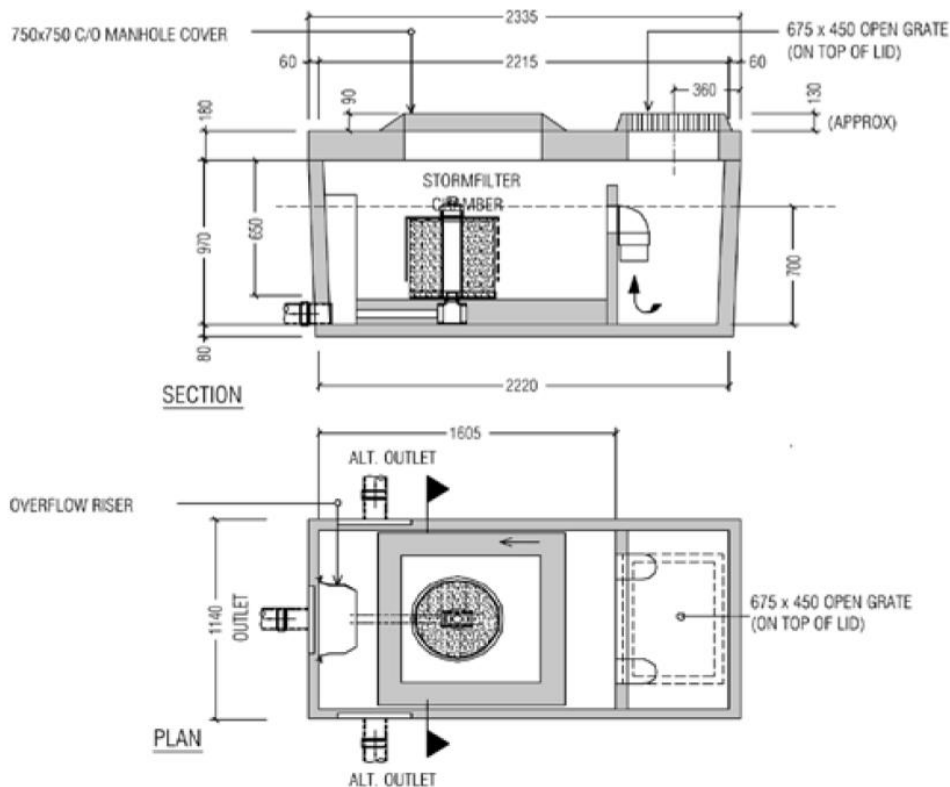
Figure 4: Options for surface drainage

Many projects have challenges around the conveyance of runoff to the treatment devices whilst incorporating the use of the road carriageway for parking. The treatment swales needed to be located where the vehicle occupants can exit the vehicle to a clear and safe platform, which is in juxtaposition with the need to provide a device as close as possible to the source of the runoff. This project overcame this dilemma with the introduction of under footpath conveyance, however with some very tricky hydraulic engineering to ensure that flow did not bypass the entry, due to high flow velocity as the runoff entering the diversion to the swale.



Photo 2: Road-side swale – entry under footpath

One of the fundamental objectives of the project was to clean the stormwater runoff, therefore treat before discharge. However the base of the project was the area where the most park activity occurs, such as entry to the beach, amenities block and also the boardwalk and footpath. Providing stormwater management was challenging in this location, therefore a compact and underground device was chosen as the park activity needed to be a high priority. A proprietary device was installed to achieve the "treatment prior to discharge" outcome.



Catchpit Stormwater

Figure 5: Proprietary unit treatment

The re-development of the park objective was to create a place for enjoyment with an information/education element being the "finishing touch". The stormwater treatment devices are a large feature on the landscape for this project therefore the wayfinding and information boards are valuable asset for these features, if not the whole project. These information boards were developed to showcase and illustrate the design elements so that the park community can interpret the design and understand the value these various stormwater management devices play in the overall context of the park development. These are permanent features which have been successfully implemented and received by the park community.



Figure 6: Wayfinding signage

Engaging with the construction team prior and during construction meant that not only was the design principles shared with the contractor the personal engagement between designer and contractor was established. When extra underground services were located which caused construction issues there was a direct communication link activated between designer and contractor. This resulted in quick and informed adjustments to the design which benefited the delivery of the project, provided the required clearances for long term performance and continued supply of the stormwater network service

4 MEETING THE PROJECT OBJECTIVES

Meeting project objectives is not solely about meeting the project budgets. The tangible objectives such as effectiveness of the project in terms of improved environmental outcomes, increased visitation and public satisfaction as well as awareness of park values are also part of meeting the park objectives.

This project has realized the vision for Taurarua Judges Bay by delivering a world class public amenity and open space which preserves and celebrates the strong and rich cultural heritage. There is a range of new amenities which deliver opportunities for land and water based activities which cater for the needs of the local community and users of the park.

There are significant improvements in the stormwater quality and person safety which contribute to a safe, clean, green and sustainable park environment. By delivering these outcomes the destination is rich in natural cultural and social values and fosters a strong sense of pride in being part of the city of Auckland.

Visitation levels have increased, since this projects completion, due to the previous perception that this park was a heavily silted, unclean lagoon that is now a vibrant engaging open space which has many recreational opportunities. The Public feedback has been very positive with a notable increase in wider community use for a variety of activities both passive and active. Another positive outcome is that there has been a

dramatic drop in vandalism which demonstrates that the community cherishes this public asset.

There has been a wide range of community and stakeholder engagement throughout the project which includes community groups, interest groups, Iwi, historic places trust and internal council stakeholders. This diverse range of stakeholders has an equally diverse range of concerns and aspirations. The project team worked hard to consider and include all of the aspirations into the design. This was delivered successfully through a range of cross disciplinary workshops. This was received in a positive light and since completion there has generally been a positive feedback to the team.

5 SUMMARY

There are many aspects to good design of stormwater management within an urban environment which results in a low impact on the environment. A collaborative approach from the project team ensured that there was a good understanding of each other's disciplines which also provided opportunities to integrate inter- discipline objectives within the stormwater management design.

The design process for this project included observing the utilisation of the park, which identified an element that needed to be protected. The site observations identified the area suggested for a pond was being used as a picnic area for the park visitors therefore this was taken as an important design element that needed to be preserved. The introduction of a stepped raingarden reduced the footprint from the larger pond area, and also preserved the picnic area whilst treating the runoff prior to discharge.

Historic information provided a direction for integration of surface water imagery if not restoration of the natural watercourse within Judges Bay Road. The treatment swales introduced a surface flow conveyance which mimicked the historic stream.

Topographical and park utilization challenges the stormwater management design. Often the best practical outcomes need to incorporate these elements. Underground proprietary devices ensure that the design objectives are met in high public utilization areas such as the footpath and boardwalk area of the park.

Signage boards are a valuable asset for this project as they provide stormwater management information for the community to interpret and understand the design. They have become a feature in their own right for the project.

The construction of the stormwater management system is just as important as the design phase. Early engagement with the construction team (for this project) by the designers lead to a strong relationship that could understand the requirements of both facets which could react and solve onsite issues that were not apparent during the design phase.

Meeting project objectives is not solely about meeting the budget. There are tangible results such as increased visitor visitation and public awareness of stormwater management that are equality important as monetary value, as well as Auckland community being provided a world class park.



Figure 7: Final design layout



Photo 3: World class park – Taurarua Judges Bay

ACKNOWLEDGEMENTS

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