



# Collaroy/Narrabeen Coastline Hazard Lines

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Sea Level Rise Seminar

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# Content of Presentation

1. History of CN coastal erosion
2. Early actions to minimise damage
3. Relevant studies and plans
4. 2002 seawall proposal
5. Review of existing hazard lines
6. Other Warringah Council initiatives relating to sea level rise

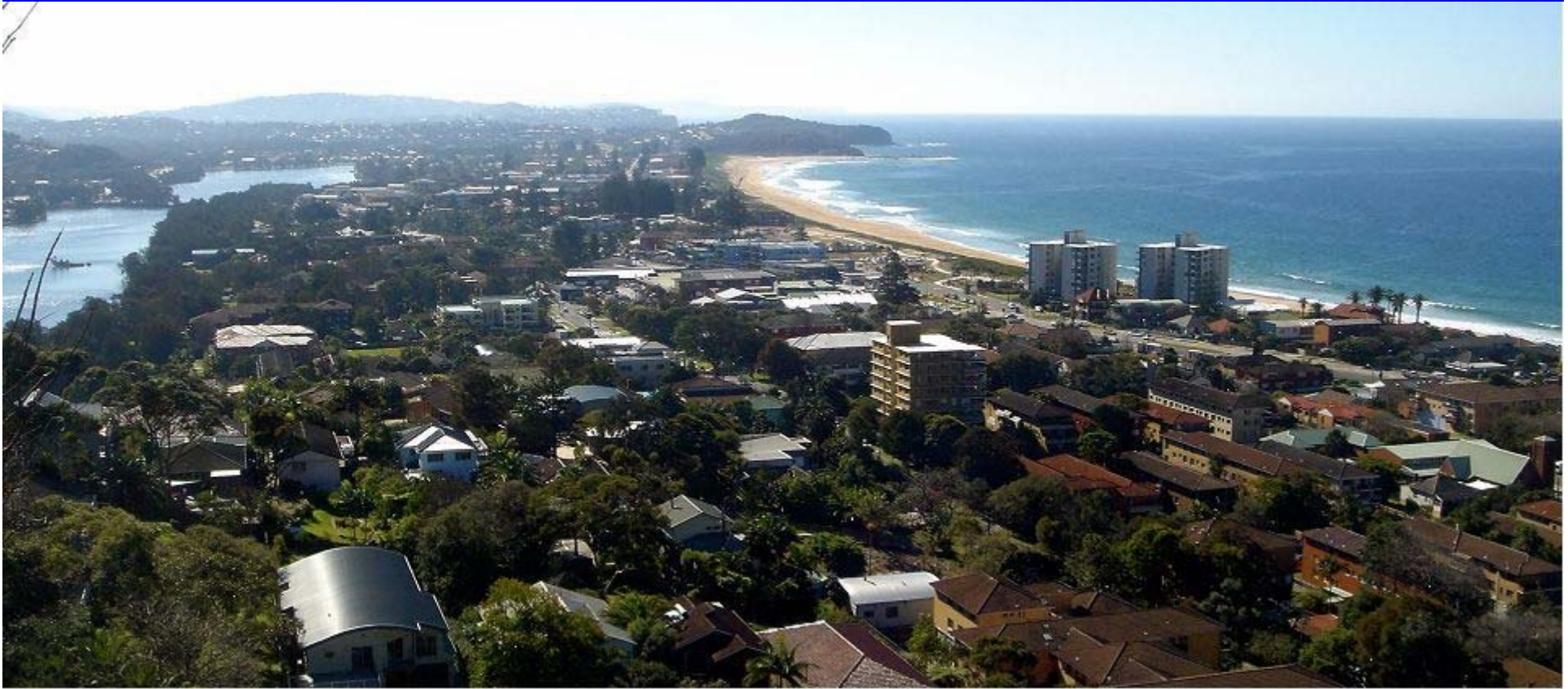












# Coastal Erosion

## Collaroy/Narrabeen Beach

- Long history of storm damage and coastal erosion
- Nationally - 3<sup>rd</sup> area most at risk from coastal processes



# Coastal Erosion

## Collaroy/Narrabeen Beach

- Storms caused considerable damage in the 1920s, 1940s, 1960s and 1970s.
- Cause of the problem:

*“The problem stems from the fact that the initial sub-division was too close to the beach with properties extending into the active beach zone.” (Nielsen Lord Associates, 1988).*



Collaroy Beach circa. 1907 showing the ladies dressing 'shed' — *M.A.B. photo, National Library of Australia.*



Collaroy beach front following the great storm of 1920. The surf club is visible in the background — *Faviell Collection*.



**The Sydney Morning Auditor, 14.06.1945.**



**'Flight Deck' Apartment Building, 1967.**



**1974 coastal surveillance**



**Goodwin St to Wetherill St, 1977.**



**Wetherill St, pre-1980**





**Collaroy Beach, April 1995**



**Collaroy Beach, April 1995.**



**Narrabeen Beach, June 2007**



Collaroy Beach, June 2007



**Source: SMH, 12 Jun 2007**



**Wetherill St, June 2007**







# History of Storm Damage

- A detailed history of the storm damage from 1880 to 1986, is provided in:

*Collaroy/Narrabeen Beaches - Coastal Process Hazard Definition Study (PWD 1987).*

# Early actions to minimise property damage

- Building lines were established following severe storms in 1967 and 1974:
  - 15m setback north of Goodwin St
  - 23m setback south of Goodwin St to Jenkins St

# Studies and reports

- *Coastal Management Strategy*, prepared for Council in conjunction with the Public Works Department of NSW (WSC 1985);
- *Collaroy/Narrabeen Beaches Coastal Process Hazard Definition Study*, prepared for Council by the Public Works Department (PWD 1987);
- *Collaroy/Narrabeen/Fishermans Beach Coastal Management Strategy - Phase One: Hazard Definition*, prepared for Council by Nielsen Lord Associates (NLA 1988);
- *Collaroy/Narrabeen/Fishermans Beach Coastal Management Strategy - Management Options and Appendices*, prepared for Council by Nielsen Lord Associates and Travers Morgan Pty Ltd (NLA 1989).

# Studies and reports (cont.)

- *Narrabeen-Collaroy Fishermans Beach Coastal Management Strategy – Management Options*, prepared for Council by Nielsen Lord Associates & Travers Morgan P/L (1989);
- *Collaroy-Narrabeen Beach – Hazard Mapping*, prepared for Council by Nielsen Lord Associates (1990);
- *Criteria for the Siting and Design of Foundations for Residential Development*, prepared for Council by Geomarine P/L and Coffey Partners International P/L (1991);
- *Collaroy/Narrabeen Beach Nourishment Investigations*, prepared for Council by Patterson, Britton & Partners (1993)

# Key Reports re Hazard Lines

1. *Collaroy-Narrabeen Beach – Hazard Mapping*, prepared for Council by Nielsen Lord Associates (1990)

Provided basis for the development of a set of *Interim Building and Development Guidelines*.

Contained maps showing:

- “immediate” impact lines for the beachfront
- predicted “50 year” impact lines (should no action be taken to protect existing development)

# Key Reports re Hazard Lines

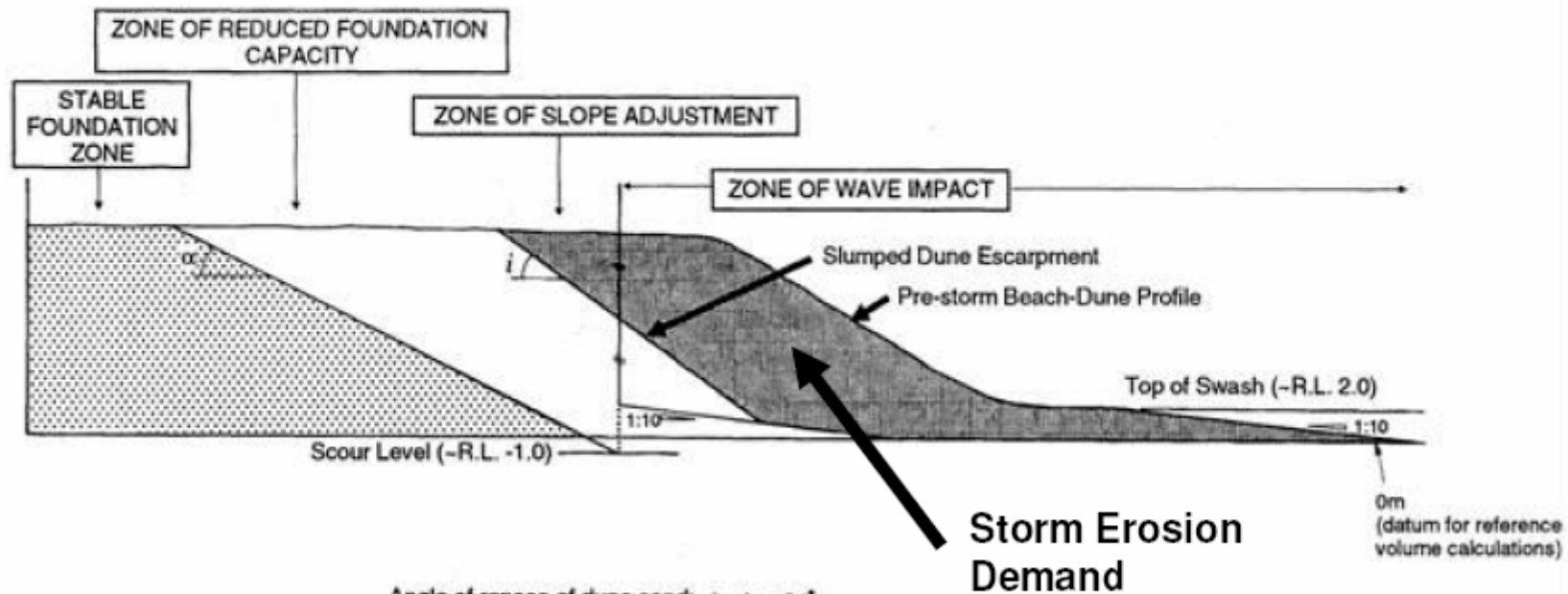
2. *Criteria for the Siting and Design of Foundations for Residential Development*, prepared for Council by Geomarine P/L and Coffey Partners International P/L (1991)

Provided a series of Hazard Maps for the beach, delineating the following hazard zones:

- Wave Impact Zone
- Zone of Slope Adjustment
- Reduced Foundation Zone

NB - Maps used were based on the “immediate” hazard lines.

# Dune Stability Schema



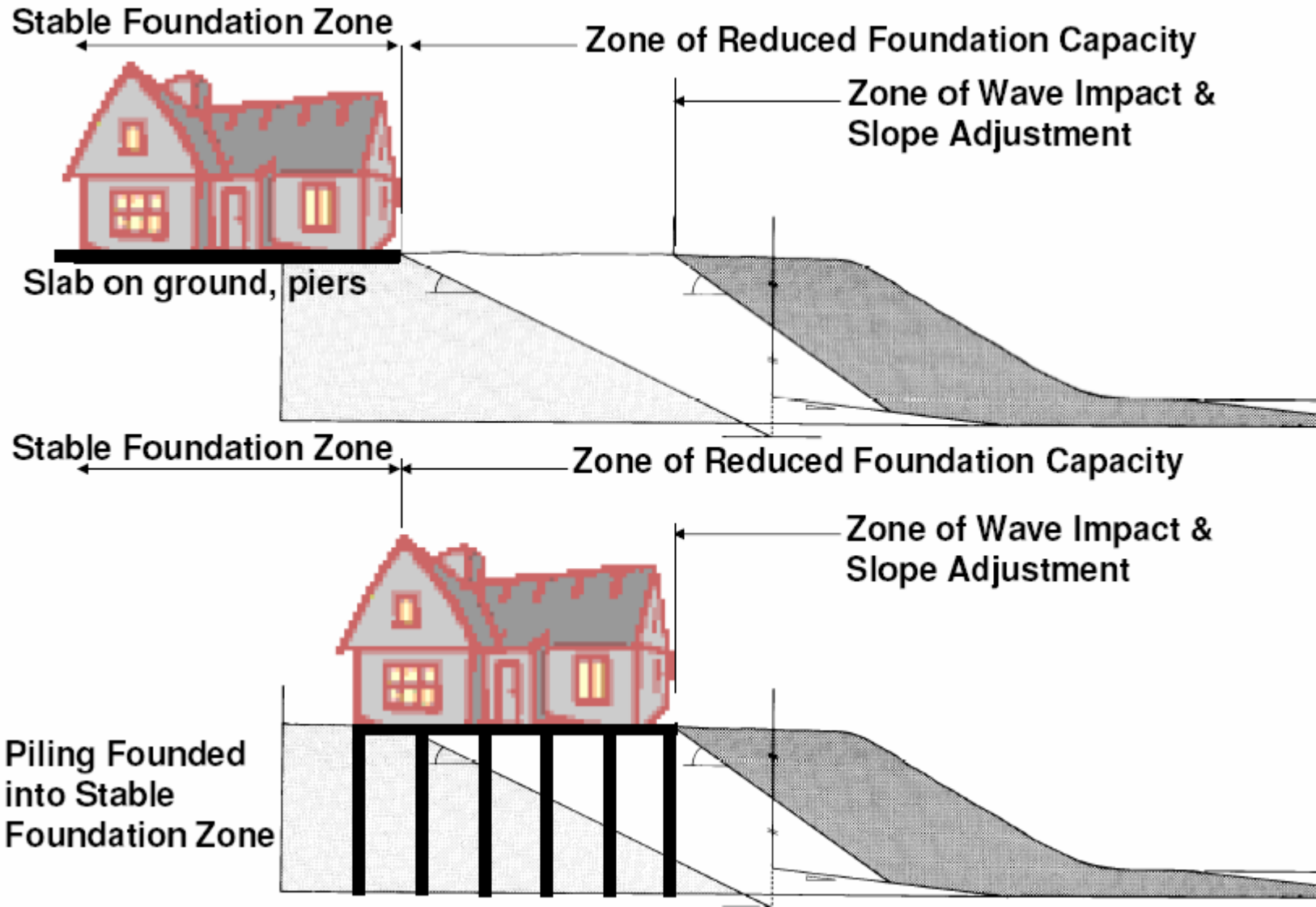
Angle of repose of dune sand:  $i - \phi = 34^\circ$

Safe angle of repose of dune sand:  $\alpha = \tan^{-1}[(\tan \phi)/1.5] \approx 24^\circ$

All levels to AHD

(Source: Lex Nielsen)

# Dune Stability - Foundation Considerations



(Source: Lex Nielsen)











# Collaroy/Narrabeen Coastline Management Plan (1997)

Adopted in 1997

Identifies management strategies for dealing with coastal erosion along the beach.



# Management Strategies include:

1. Undertake protective works
2. Environmental planning measures
3. Development control and conditions
4. Dune Management



# Implementation Progress

- Substantial progress
- Of the 13 actions, only two have not been started (ie. A2 and A3), with actions relating to moderate beach nourishment on hold pending State & Federal Government support.
- All high priority actions are at various stages of implementation, being either complete, ongoing or underway.
- Some of the actions have not proven to be sustainable in the long term (eg B6 - purchase of properties), or popular with the community (eg. A2 - seawall).

# Actions relating to the Hazard Lines

Strategy	Actions
A. Undertake protective works	<ol style="list-style-type: none"> <li>1. Survey and assess existing seawalls.</li> <li>2. Selective reconstruction of existing seawalls and minor construction to infill gaps in existing walls.</li> <li>3. Undertake moderate nourishment of beach in association with reconstruction of seawalls.</li> <li>4. Improvements to stormwater outlets along beachfront.</li> </ol>
B. Implement environmental planning measures	<ol style="list-style-type: none"> <li>5. Amend Section 149 Certificates.</li> <li>6. Selective voluntary purchase/open space acquisition of single residential properties.</li> <li>7. Planned retreat of Collaroy Surfclub buildings.</li> </ol>
C. Implement development control conditions	<ol style="list-style-type: none"> <li>8. Maintain/review building and development controls for beachfront.</li> <li>9. Revise coastal emergency management procedure for Collaroy/Narrabeen Beach</li> <li>10. Review building lines for beachfront.</li> </ol>
D. Undertake Dune Management	<ol style="list-style-type: none"> <li>11. Maintain moderate sand nourishment and extend dune reconstruction and revegetation.</li> <li>12. Continue current dune maintenance.</li> <li>13. Improve beach amenity through ongoing beach reserve improvements and maintenance works.</li> </ol>



# Action C8 – Maintain/review building and development controls for beachfront

- Council still has the Hazard Lines and Development Guidelines in place that were developed in 1990/91.
- Chronological summary:

1990/91      Adopted by Council

1997      Incorporated into Coastline Management Plan

2000      Incorporated into the Warringah Local Environment Plan (WLEP 2000) as *Schedule 13 – Development Guidelines for Collaroy/Narrabeen Beach*

# Discussion Points & Issues

- Incorporation of the Hazard Lines and Hazard Maps into planning documents a testament to the robustness and quality of the scientific and engineering studies that underpin them.
- However, the Hazard Lines Council has been using for the last 15 years, are the “**immediate**” Hazard Lines as calculated in 1991.
- They do not take account of longer term predicted changes due to Climate Change, such as sea level rise and long term beach recession.

## Discussion Points, Issues (cont.)

- Plan's intention was that a review of the Development Guidelines for Collaroy/Narrabeen Beach would be undertaken following Action A-2, which was the *“Selective reconstruction of existing seawalls and minor construction to infill gaps in existing walls”*.
- It was thought that after the seawall was built and nourishment took place, the Hazard Lines would become obsolete.

# Proposed Seawall Upgrade 1998 - 2003

- Detailed proposal to upgrade the 1.1km of ad-hoc built seawall that exists in front of approximately 55 properties
- 2002 – Public exhibition of proposal











# Proposed Seawall Upgrade Public Exhibition 2002

- Over 550 submissions were received - the vast majority objected to the seawall.
- Due to the widespread community opposition, Council resolved on 25 February 2003:
  - *Not to proceed with the proposed seawall upgrade;*
  - *To investigate alternative options for protecting properties against coastal erosion, particularly the sourcing of offshore sand for beach nourishment.*

# Have the Hazard Lines been successful?

- Have served Council well
- Used by Council staff in assessing/considering DAs
- Some applicants, that have had DAs refused, have exercised their right of appeal through the Land & Environment Court.
- Such appeals have had very limited success (eg. Cranswick-Smith v Warringah Council 2002, and Welsh v Warringah Council 1999).

# Why review the Hazard Lines?

- Action in Coastline Management Plan.
- They haven't been examined / reviewed since 1990.
- Used by Council officers on a daily basis.
- Seawall option not being pursued, and the prospect of nourishing the beach with offshore sand could be a long way off.
- ***CLIMATE CHANGE AND SEA LEVEL RISE.***
- Council has a 'duty-of-care'



***“Life's a beach, and then it disappears”  
(SMH, 19/07/2006)***

# What if the Hazard Lines move as a result of the Review?

- 'Wind-fall' gains or losses?
- If Seaward – new DAs/increased development?
- If Landward - claims for compensation?

# Review deliverables

1. Assess the validity and methodology used to determine the Hazard Lines currently in place (ie. 1991 lines).
2. Calculate and determine the locations of the following sets of Hazard Lines:
  - Immediate Hazard Lines (ie. the immediate future).
  - 50 Year Hazard Lines (ie. taking into account current predictions of sea level rise and long-term shoreline recession).

# Review deliverables (cont.)

3. Provide a detailed explanation and justification for any change to the current Hazard Lines.
4. Prepare updated sets of Hazard Maps.
5. Provide advice and recommendations on any actions Council should undertake resulting from the findings of this Review.
6. Final Report

# Project chronology

Apr 2007 - Call for Quotations

Jun 2007 - Appointment of successful consultant (Patterson Britton & Partners Pty Ltd)

Jun 07 – 08 - Review period



# Current status of project

- Council has received a preliminary draft report.
- Council staff currently reviewing report.
- A meeting will soon be organised with staff from DECC (Coastal branch) to discuss the report's findings.

# Matters for consideration

- The extent to which we account for the existing protection works in the area (i.e. the ad-hoc rock rubble seawall).
- Consultation with land-owners.
- New Warringah LEP and DCP

# Other Council initiatives relating to sea level rise

- Partnership projects with Sydney Coastal Councils Group (SCCG).
- Consideration of impacts on coastal lagoons and floodplain planning.
- Emergency Management of Coastal Erosion.

# Acknowledgments

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Thank You