

A. Seawall			B. Levee or sea dike		
Criteria & Constraints	Score	Notes	Criteria & Constraints	Score	Notes
Ability to break or block waves	● ● ●	These can break apart with the force of a large tsunami. Water can flow over them.	Ability to break or block waves	● ●	These structures are best for smaller amounts of water, but can actually perform worse when a large wave hits them.
Impact on boats/ocean traffic	● ● ● ● ●	Built on land so it does not affect boat traffic.	Impact on boats/ocean traffic	● ● ● ● ●	Built on land so it does not affect boat traffic.
Impact on marine life	● ● ● ●	Marine life is not typically impacted, but life that needs access to land at some point (sea turtles) may not be able to reach their nesting grounds.	Impact on marine life	● ● ●	Can impact the flow of water along the shore in coastal ecosystems and affect marine life.
Impact on ocean view	●	In some places, walls can completely block ocean views.	Impact on ocean view	● ● ● ●	Smaller than other solutions and usually does not block the ocean view.
Cost	● ● ●	Walls are expensive to build, but materials for them are affordable.	Cost	● ● ● ● ●	Affordable and typically made of rocks, soil, and grass.
Time to build	● ● ●	Some large walls can take years to build, while other smaller walls can be put into place more quickly.	Time to build	● ● ● ●	Levees or sea dikes are smaller and can use local materials so building them can be quicker than other solutions.
Maintenance	● ● ●	Walls can last decades, but require ongoing maintenance to ensure the structure is still functioning the correct way.	Maintenance	● ● ● ●	Levees or sea dikes are relatively easy to maintain.
C. Recurved wall			D. Tetrapods		
Criteria & Constraints	Score	Notes	Criteria & Constraints	Score	Notes
Ability to break or block waves	● ● ● ● ●	Can completely absorb and reflect large waves.	Ability to break or block waves	● ● ● ●	Tetrapods reduce the energy of a wave by reflecting it in all different directions. Flooding can still occur as water flows through them.
Impact on boats/ocean traffic	● ● ● ● ●	Built on land so it does not affect boat traffic.	Impact on boats/ocean traffic	● ● ●	Tetrapods are often above the surface, so boats must steer around them in small bays and along the coast.
Impact on marine life	● ● ● ●	Marine life is not typically impacted, but life that needs access to land at some point (sea turtles) may not be able to reach their nesting grounds.	Impact on marine life	● ●	Tetrapods have been shown to decrease fish populations and disrupt normal erosion along the coast.
Impact on ocean view	● ●	Large walls can block the ocean view, but recurved walls can be smaller than vertical walls because they use a curved angle to reflect the wave up and back out to sea.	Impact on ocean view	● ● ● ●	Tetrapods typically do not obstruct ocean views, but can be seen on the horizon.
Cost	● ●	Walls are expensive to build, and the curved nature of this wall is an added expense.	Cost	● ● ● ●	Concrete and molds are shipped to sites where tetrapods are built to save costs.
Time to build	● ● ●	Some large walls can take years to build, while other smaller walls can be put into place more quickly. Curved walls require additional work to mold the concrete.	Time to build	● ● ● ●	Making and stacking tetrapods can happen quickly onsite.
Maintenance	● ● ●	Walls can last decades, but require ongoing maintenance to ensure the structure is still functioning the correct way.	Maintenance	● ● ●	Tetrapods are made of sturdy, heavy concrete and are more resistant than rock from being washed away, but they do erode from ocean currents.

E. Rock armor			F. Submerged breakwater		
Criteria & Constraints	Score	Notes	Criteria & Constraints	Score	Notes
Ability to break or block waves	● ● ●	Rock armor can break up waves. However, water can still pass through, resulting in flooding. The force of the wave will be less than having nothing at all.	Ability to break or block waves	● ● ● ●	Effective at breaking up a wave. However, they can trap water from waves being reflected from the shore, which increases the level of water near shore.
Impact on boats/ocean traffic	● ● ●	Typically found along the shoreline, but can also be built into bays as walls to break up waves. Boat traffic must navigate around these structures.	Impact on boats/ocean traffic	● ● ● ●	Only boats needing deeper water are affected by submerged breakwater.
Impact on marine life	● ● ●	Provides habitat for some marine life, but may cause the loss of habitat for other life.	Impact on marine life	● ●	Can influence the flow of water and the movement of marine life.
Impact on ocean view	● ● ● ●	While they are not very nice to view on land, they typically do not obstruct ocean views.	Impact on ocean view	● ● ● ● ●	The ocean view is not affected since the solution is below the water.
Cost	● ● ● ● ●	Rock is an affordable material to use.	Cost	●	Can be very expensive to build, depending on the depth of water and the length needed.
Time to build	● ● ● ●	Rock armor walls can be built fairly quickly if the land is owned by the community where it needs to be built.	Time to build	● ●	Because it requires heavy, specialized machinery to build on open water and multiple layers of material, it can take a significant amount of time to construct one.
Maintenance	● ● ●	Rock wears down over time and erodes away.	Maintenance	● ● ● ●	When built well, breakwaters can last decades. However, they will slowly wear down due to wave action.
G. Mangrove forest			H. Pine forest		
Criteria & Constraints	Score	Notes	Criteria & Constraints	Score	Notes
Ability to break or block waves	● ● ●	Can block much of the wave's energy for smaller tsunamis, but does not hold up as well to larger tsunamis.	Ability to break or block waves	● ●	Can break up the energy of a small tsunami, but less effective for larger waves.
Impact on boats/ocean traffic	● ● ● ● ●	Does not impact normal ocean traffic.	Impact on boats/ocean traffic	● ● ● ● ●	Does not impact normal ocean traffic.
Impact on marine life	● ● ● ● ●	Offers a natural coastal environment.	Impact on marine life	● ● ● ● ●	Offers a natural coastal environment.
Impact on ocean view	● ● ● ●	Can block some ocean view. They can grow up to 30 feet tall in parts of Japan and 80 feet in more tropical areas.	Impact on ocean view	● ● ●	Grows an average of 20 feet tall when planted on a beach. Branches spread out, making it difficult to see the ocean.
Cost	● ● ● ●	Considerably less expensive than concrete structures.	Cost	● ● ● ● ●	Inexpensive to build compared to concrete and rock solutions.
Time to build	●	Can only grow in the southernmost parts of Japan. They are tropical plants and will not grow in northern parts of Japan.	Time to build	●	Can take decades to fully mature.
Maintenance	● ● ● ●	Once established, the forest requires limited maintenance to keep it thriving and free of pollution.	Maintenance	● ● ● ●	Once established, it requires very little maintenance.