Table E.6
Summary of Cost and Damages
Without Project – Structure Relocation Alternative
Including Offshore Nourishment for Phase 3 Emerald Isle

year	Cumulative Present Worth Cost to Property Owners	Cumulative Present Worth Damage to Infrastructure	Cumulative Present Worth Lost Tax Revenues Town & County	Present Worth Cost and Damages	Phase 3 Beach Nourishment Cost Using Offshore Borrow Area	Total Economic Cost for Relocation Alternative
2	$1,482,000	$267,300	$6,900	$1,756,200	$5,800,000	$7,556,200
4	$3,087,900	$358,700	$31,800	$3,478,400	$5,800,000	$9,278,400
6	$4,361,600	$475,500	$71,500	$4,908,600	$5,800,000	$10,708,600
8	$5,060,700	$575,300	$124,400	$ 5,760,400	$5,800,000	$11,560,400
10	$7,127,500	$667,200	$191,000	$ 7,985,700	$5,800,000	$13,785,700

E.19. **Without Project - Interim Sandbags**. The No Action and Structure Relocation alternatives assumed that erosion of the inlet shoreline would continue unimpeded over the next 10 years, however, this will probably not occur as individual property owners and the Town of Emerald Isle will likely implement temporary shoreline protection measures to protected threatened properties and the town's infrastructure. Such actions have already taken place over the past couple of years as the property owners and the town incrementally constructed approximately 700 feet of sandbag revetments along the inlet shoreline. Also, at least one property owner elected to move his building away from the inlet with the structure being relocated completely off of Bogue Banks. Accordingly, the Interim Sandbag Alternative was based on the more likely response to continue erosion of the inlet shoreline in which the individual property owners and the town would elect to install temporary sandbags to provide interim protection to threatened buildings and roads.

E.20. Adhering to the State rules that allow sandbags to be installed when a structure is considered to be threatened, i.e., erosion has moved the shoreline to with in 20 feet of the structures foundation (or septic tank) or within 20 feet of the road right-of-way, the Interim Sandbag Alternative was based on property owners and the Town of Emerald Isle installing sandbags to protect threatened structures and roadways. The analysis was carried out on a yearly basis over a period of 10 years using an inlet shoreline erosion rate of 60 feet/year. When erosion threatened a structure, a sandbag revetment would be installed and remain in place for a period of 2 years after which the sandbags would have to be removed resulting in the loss of the structure and exposure of the next row of homes to the erosion threat. When a section of a road is threatened, sandbags would be installed to protect that section of the road. The sandbags protecting the road would remain in place for a period of 5 years after which the sandbag structure would have to be removed resulting in the loss of that section of the road and an increased threat to other sections of

the roads. The yearly sequence of events for Without Project Alternative No. 2, which gives the year sandbags are constructed and/or removed and the year structures and roads are lost, is attached at the end of this Appendix (Attachment E-1). For the Interim Sandbag Alternative, the temporary access road to the west end of Bogue Court would not be required until year 6.

E.21. **Erosion Damage to Real Property and Infrastructure – Interim Sandbag Alternative**. Damage to real property and infrastructure along with the cost of the interim sandbag structures for are given in Tables E.7.

Table E.7
Without Project – Interim Sandbag Alternative
Present Worth of Cumulative Damages to Real Property,
Infrastructure, and Sandbag Costs
Inlet Shoreline Erosion Rate = 60 feet/year

Year	Sum of Parcels	Sum of Vacant Lots	Damage to Real Property[1]	Cleanup Cost [2]	Construction Cost of Sandbags	Maintenance Cost of Sandbags	Removal Cost of Sandbags
2	5	0	$822,200	$82,200	$136,900	$27,400	$31,200
4	9	0	$1,526,600	$152,700	$275,200	$101,800	$45,200
6	13	1	$2,796,500	$268,200	$442,900	$203,600	$64,400
8	20	1	$4,495,800	$440,300	$563,600	$332,700	$102,700
10	31	2	$6,085,400	$577,400	$569,300	$414,700	$143,000

Year	Damage to Infrastructure[3]	Total Damages
2	$0	$1,099,900
4	$0	$2,101,500
6	$216,000	$3,992,600
8	$283,400	$6,218,500
10	$345,100	$8,134,900

[1] Future values based on an inflation rate of 4.8% per year.
[2] Cleanup cost = 10% of structure damage (does not include vacant lots)
[3] Includes new access roads, damage to existing roads, waterlines, electric service, and telephone service.

E.22. **Loss of Tax Revenue and Impact on Local Economy – Interim Sandbag Alternative**. The impacts of the continued migration of the inlet shoreline into the Pointe subdivision on tax revenues and the local economy were computed in the same manner as for the No Action Alternative, that is, these impacts were based on the number of structures lost to erosion and the timing of their loss. In the case of Interim Sandbag Alternative, 29 structures would be lost compared to the 36 structures that would be lost if sandbags were not used (No Action Alternative). A summary of the tax revenue losses for the Interim Sandbag Alternative is provided in Table E.8 with the reduction in household spending summarized in Table E.9. Table E.10 provides a summary of all of the economic impacts for Alternative No. 2 in 2-year intervals throughout the 10-year period of analysis.

Table E.8
Present Worth of Tax Revenue Losses
Without Project Condition – Interim Sandbag Alternative

Year	Cumulative Present Worth Lost Property	Emerald Isle Present Worth Cumulative Tax Losses	Carteret County Present Worth Cumulative Tax Losses	Town & County Present Worth Cumulative Tax Losses
0	$923,900	$1,600	$4,300	$5,900
1	$871,600	$3,100	$8,300	$11,400
2	$822,200	$4,600	$12,200	$16,800
3	$1,218,500	$6,700	$17,800	$24,500
4	$1,526,600	$9,400	$24,900	$34,300
5	$2,207,900	$13,200	$35,200	$48,400
6	$2,796,500	$18,100	$48,200	$66,300
7	$2,817,000	$23,100	$61,300	$84,400
8	$4,495,800	$30,900	$82,200	$113,100
9	$4,910,400	$39,500	$105,000	$144,500
10	$6,085,400	$50,200	$133,300	$183,500

Table E.9
Reduction in Household Spending
Without Project Condition – Interim Sandbag Alternative

Year	Cumulative Households Impacted	Present Worth Reduced Household Spending	Cumulative Present Worth Reduced Household Spending
0	5	$70,000	$70,000
1	5	$69,300	$139,300
2	5	$68,700	$208,000
3	8	$96,700	$304,700
4	9	$121,300	$426,000
5	11	$141,300	$567,300
6	12	$158,700	$726,000
7	13	$205,500	$931,500
8	19	$246,600	$1,178,100
9	21	$312,000	$1,490,100
10	29	$369,300	$1,859,400

Table E.10
Summary of Damages and Impact on Local Economy
(Without Project Condition – Interim Sandbag Alternative)

year	Cumulative Present Worth Damages [1]	Cumulative Present Worth Lost Taxes Town & County	Cumulative Present Worth Reduction in Household Spending	Total Present Worth Economic Impact
2	$1,099,900	$16,800	$208,000	$1,324,700
4	$2,101,500	$34,300	$426,000	$2,561,800
6	$3,992,600	$66,300	$726,000	$4,784,900
8	$6,218,500	$113,100	$1,178,100	$7,509,700
10	$8,134,900	$183,500	$1,859,400	$10,177,800

[1] Includes lost structures, damage to infrastructure, temporary access roads and costs associated with sandbags.

E.23. **Total Costs of Without Project – Interim Sandbag Alternative**. As was the case No Action Alternative, the cost for nourishing the western 20,000 feet of Emerald Isle using material from the offshore borrow areas will be added to the total present worth of damages and economic losses given in Table E.10 in order to obtain the without project costs of the Interim Sandbag Alternative for comparison with the cost of the channel relocation project. These combined costs are given in Table E.11

Table E.11
Total Costs for Without Project Condition – Interim Sandbag Alternative
Including Offshore Nourishment Cost for the West End of Emerald Isle

Year	Total PW Damages & Economic Impact Plus Offshore Dredging Costs
2	$7,124,700
4	$8,361,800
6	$10,584,900
8	$13,309,700
10	$15,977,800

E.24. **Summary of Economic Impact of Without Project Conditions**. Three alternative without project conditions were evaluated, two in which the inlet shoreline was assumed to continue to migrate to the east unimpeded and one in which sandbag revetments would be used to slow the rate of shoreline migration. Damages to existing development and infrastructure and the associated impact on the local tax base were estimated over a 10-year period based on an inlet shoreline erosion rate of 60 feet/year. In addition to the structural damages associated with the continued movement of the inlet shoreline, the impact of losing structures and households on the local economy was estimated for the No Action and Interim Sandbag Alternatives. The Relocation Alternative evaluated the costs that would be incurred by individual property owners to move their threatened structures to more secure lots within the town limits of Emerald

Isle. All future damages and economic losses were normalized to a present worth value based on an interest rate of 6 percent. Finally, since the without project condition would not place material on the west end of Emerald Isle from Bogue Inlet, the costs of nourishing the west end of the town using material from the approved offshore borrow areas was added to the without project costs. The total economic impact for the three without project Alternatives are summarized in Table E.12.

Table E-12
Summary of Total Economic Impact of Without Project Alternatives

Alternative	Year 2	Year 4	Year 6	Year 8	Year 10
No Action	$7,670,300	$11,083,400	$13,763,400	$16,707,100	$20,393,500
Struct. Relocation	$7,556,200	$9,278,400	$10,708,600	$11,560,400	$13,785,700
Interim Sandbags	$7,124,700	$8,361,800	$10,584,900	$13,309,700	$15,977,800

E.25. **Without Project Evaluation**. All seven project alternatives are evaluated to determine if the alternatives satisfy the project goals and objectives. In this regard, the goals and objectives of the Bogue Inlet Channel Erosion Response Project are as follows:

Project Goals and Objectives:

1. Eliminate or ease the erosion along the Pointe shoreline.
2. Maintain Town's tax base by protecting existing development and infrastructure on the west end of Emerald Isle.
3. Reestablish public access to the inlet shoreline.
4. Restore the habitat of the inlet shoreline.
5. Obtain high quality beach nourishment material for Phase 3 of the Emerald Isle beach nourishment project.
6. Improve or maintain recreational opportunities along the Town's ocean shoreline.

E.26. **No Action Alternative**. The No Action Alternative would not eliminate or ease erosion of the Pointe shoreline nor would it protect development and infrastructure on the west end of Emerald Isle. In this regard, the total economic impact of the No Action Alternative would range from approximately $1.9 million two years hence to a total of $14.5 million in 10 years. The economic impact would include the loss of 36 structures and 1,640 feet of roads (Bogue Court, Inlet Drive, and Inlet Drive) and associated utilities. The public beach access that was lost to the channel migration would not be restored as the channel would continue to migrate to the east. The habitat along the inlet shoreline, which is currently dominated by sandbags, would also continue to deteriorate even in the absence of additional sandbags. Under this alternative, material needed to nourish the west end of Emerald Isle would be obtained from the approved offshore borrow areas at a cost of approximately $5.8 million. The quality of the offshore material, which has been used for Phase 1 and Phase 2 of the Bogue Banks beach nourishment project, has proven to be less than ideal primarily due to the high shell content. While the offshore borrow material used for Phase 1 and 2 appears to be

weathering and adjusting to more satisfactory characteristics, the initial placement of the material caused considerable controversy over concerns with its recreational quality and environmental impacts.

E.27. **Structure Relocation Alternative**. The Structure Relocation Alternative, which also involves the continued eastward migration of the inlet channel and its associated erosion of the inlet shoreline, would not control the inlet shoreline erosion or protect the development at the Pointe. The total economic impact of the Structure Relocation Alternative would range from $1.75 million in year 2 to $8.0 million in year 10. A total of 36 structures would be moved from the Pointe area to other sections of Emerald Isle, which would preserve some of the tax base, however, the Town and County would lose the tax value of 41 lots (36 developed and 5 vacant). As with the No Action Alternative, 2,200 feet of roads and utilities would be lost. Public beach access at the Pointe would not be restored and the inlet shoreline habitat would continue to deteriorate. This alternative would also cost individual property owners $7.1 million over a 10 year period. While the economic impact of this alternative is less than the No Action Alternative, the losses to the local economy and tax base would be substantial. As with the No Action Alternative, beach nourishment material for Phase 3 of the Bogue Banks beach nourishment project would be obtained from offshore borrow areas at a cost of $5.8 million. Therefore, impacts on recreational opportunities along the Town's ocean shoreline would be the same as the No Action Alternative, i.e., the quality of the beach fill material would be less than ideal.

E.28. **Interim Sandbags**. The installation of interim sandbags to protect threatened structures and infrastructure on the west end of Emerald Isle would only delay and not eliminate the continued migration of the inlet channel to the east. While such a delay would possible allow more time for the channel to naturally move to a more central position between Bogue Banks and Bear Island, there is no way to predict when or if this would occur. The sandbags would reduce structure loss to 23 and reduce the loss of roads and utilities to around 900 feet; however, the total economic impact would still be rather significant, ranging from $1.3 million in 2 years to about $10.2 million in 10 years. Public access to the inlet from the Pointe would not be restored and the installation of the interim sandbags would be perhaps more detrimental to the habitat along the inlet shoreline compared to the No Action and Relocation Alternatives. Nourishment of Phase 3 would still have to be accomplished with material obtained from the offshore borrow areas with the same consequences on recreational opportunities as the No Action and Relocation Alternatives. Again, nourishment of Phase 3 from an offshore borrow area would cost $5.8 million.

E.29. **Hard Structures**. Erosion of the Pointe shoreline could be controlled by the construction of a structure extending along the Pointe shoreline, in the form of a sloping rubble revetment or bulkhead, which would connect to a terminal groin that would project at least 1,000 feet into the ocean. This alternative was not given serious consideration since the State of North Carolina prohibits the use of hard structures to control ocean and inlet shoreline erosion. Prior to 2003, the hard structure prohibition was controlled by regulations enacted by the N.C. Coastal Resources Commission in

response to the Coastal Area Management Act (CAMA). In 2003, the N.C. State Legislature pass a law (Session Law 2003-427, § 113A-115.1) specifically prohibiting the construction of breakwaters, bulkhead, groins, jetties, revetments, seawalls, and similar structures. The state prohibition notwithstanding, the Town of Emerald Isle specifically requested that hard structures not be considered as an erosion response measure. Accordingly, since a hard structure would not be permitted by the State of North Carolina, it is not a feasible alternative and was eliminated from further consideration in this EIS

E.30. **Suspension of Corps of Engineers Channel Maintenance**. The Corps of Engineers Navigation Branch (Corps) has been using shallow draft sidecast dredges to maintain the authorized 8-foot mlw by 150-foot wide channel since 1984. During each maintenance operation, the Corps' dredging activities is restricted to deepwater channel that exist at the time. As a result, the maintenance dredging does not maintain a fixed channel alignment and the channel has continually migrated to the east during the entire maintenance dredging period. Between 1984 and 1999, the Corps removed an average of 151,500 cubic yards/year from the Bogue Inlet bar channel with disposal of this material in the open waters of Bogue Inlet. Maintenance dredging has increased dramatically between 2000 and 2002 with an average of 514,200 cubic yards/year removed by the Corps sidecast dredges. This increased maintenance activity was apparently associated with attempts to move the channel to the west away from the Pointe shoreline. The assumption associated with the suspension of Corps maintenance dredging is that the eastward migration of the channel would slow and a new channel would eventually breach through the ebb tide delta in a more central location. Based on the long-term history of Bogue Inlet, the breaching of a new channel midway between Bogue Banks and Bear Island will likely occur at some point in the future. However, given the immediacy of the erosion problem at the Pointe, waiting for the channel to naturally reposition itself will result in continued erosion and damage to the development and infrastructure at the Pointe. Under this alternative, construction of Phase 3 of the Emerald Isle beach nourishment would be accomplished using offshore borrow areas. Accordingly, the Dredge Suspension Alternative would fail to satisfy all of the project goals and objectives in much the same manner as the No Action Alternative.

E.31. **Channel Relocation without Beach Nourishment.** In the interest of rapidly reestablishing the lost intertidal habitat that will accompany the repositioning of the inlet channel, consideration was given to stockpiling the dredged material during the channel relocation and transferring the stockpiled material into the existing channel once the channel is completed. This alternative would also include the construction of a sand dike across the existing channel. Areas where the dredged material could be stockpiled include the existing Bogue Banks sand spit and the shoal area located between the new channel and the existing channel. The available dry land area on the spit totals about 900,000 square feet. Stockpiling 809,500 cubic yards in this area would result in a mound approximately 25 to feet high. Stockpiling the material in the shoal area would create some additional problems with material being transported out of the stockpile area by tidal currents. This could possibly be overcome with the construction of a temporary

sandbag dike around the stockpile area, but this would add substantially to the cost of the project. A sandbag dike around the perimeter of the shoal area would have a total length of 9,000 feet and would cost between $3.0 and $5.0 million. The area that could be used to stockpile the material has a surface area of approximately 2,000,000 square feet. Stockpiling 809,500 cubic yards in this area would create a mound approximately 12 to 15 feet high. The material could be stockpiled using a combination of the spit area and shoal area, which would reduce the height of the stockpile to around 10 feet.

E.32. The relocation of the inlet channel that would occur under this alternative would control the erosion of the Pointe shoreline and would preserve the development and infrastructure on the west end of Emerald Isle. As a result, the Town's tax base would be maintained. Access to the inlet shoreline would also be restored. The filling of the existing channel would accelerate the recovery of the inlet shoreline habitat. However, material for nourishing the west end of Emerald Isle would have to be obtained from the offshore borrow areas which would result in the same impacts on ocean shoreline recreational opportunities associated with the other alternatives. Stockpiling the inlet channel material on the Bogue Banks spit or the inlet shoal areas would smother any and all flora and fauna that reside in these areas. Environmental recovery of these areas could take several years. Finally, if the alternative involved the construction of a temporary sandbag dike to retain the dredged material, the total cost of the project would exceed the budget for the project established by the Town of Emerald Isle.

E.33. **Inlet Sand Management**. Controlling the location and orientation of the Bogue Inlet bar channel could be accomplished through a dedicated program of channel maintenance in which the material removed from the channel is deposited on the adjacent islands. However, the existing 8-foot mlw authorized depth for the inlet channel would not allow ocean certified pipeline dredges (the type of plant necessary to accomplish the work) to routinely maintain the channel given the minimum digging depths of these type dredges is 12 feet. Increasing the authorized depth in Bogue Inlet would require detailed studies by the COE and Congressional authorization for the channel improvements. The process for obtaining approval for a deeper channel would take several years with the timeline beginning once Congress authorizes the COE to conduct a study. Such a study has not been authorized nor is authority for such a study being pursued. Given the immediacy of the erosion threat to development at the Pointe, waiting to gain approval for a deeper channel and associated sediment management is not an option that would address the present needs of the Town of Emerald Isle.

E.34. The COE is conducting a feasibility study for long-term storm damage reduction for all of Bogue Banks and will consider Bogue Inlet as a possible source of beach nourishment material for portions of the island's shoreline. If the COE elects to use Bogue Inlet as a source of beach nourishment material and concentrates its activities along the channel corridor, the position of the channel could be stabilized. Any consideration of the inlet as a source of beach nourishment material will have to include sand management strategies that will distribute material to both Bogue Banks and Bear Island (Hammocks Beach State Park). The COE is not scheduled to complete the feasibility study for at least 2 more years with construction delayed for several more

years while final plans are prepared, environmental impacts evaluated, and all of the necessary requirements of local cooperation satisfied. Accordingly, the Bogue Banks storm damage reduction project may offer some means to maintain the position of the Bogue Inlet channel in the future but will not be done in time to provide any immediate relief for the Pointe.

E.35. As a result of the timeline associated with the possible implementation of an inlet sand management program, this alternative would not prevent erosion of the Pointe shoreline for a minimum of 4 years and possibly as long as 6 years. Continue erosion of the inlet shoreline during this time could result in the loss of 15 structures and approximately 550 feet of roads and utilities even if interim sandbags are used during the implementation period. The inlet sand management alternative would eventually move the inlet channel to a more central location and maintain the channel in that location for at least 50 years, thus providing long-term protection for the west end of Emerald Isle, allow for the reestablishment of public beach access to the inlet shoreline, and restore the habitat along the inlet shoreline. Waiting for the implementation of an inlet sand management plan would still require the use of an offshore borrow area to complete Phase 3 of the Bogue Banks beach nourishment project.

Attachment E.1
Without Project - Alternative No. 2 - Temporary Sandbags
Sequence of Events Using sandbags
60 ft/year erosion rate
Events given for Bogue Court and Inlet Drive Separately
Structures are identified by their Tax Office Number

Bogue Court

Year 0
Existing 700 feet of sandbags removed
Structures **9283, 9335, & 9433** lost to erosion

Year 1
Construct 200 feet of sandbags to protect structures **9541 & 9578**. Bags have to be removed in 2 years (year 3)
Construct 130 feet of sandbags to protect Bogue Court. Bags have to be removed in 5 years (year 6)

Year 2
Construct 100 feet of sandbags to protect Bogue Court. Bags have to be removed in 5 years (year 7)

Year 3
Remove 200 feet of sandbags protecting structures **9541 & 9578**. Lose these two structures.
Construct 100 feet of sandbags to protect Bogue Court. Bags have to be removed in 5 years (year 8)
Construct 100 feet of sandbags to protect structure **9685**. Bags have to be removed in 2 years (year 5)

Year 4
Construct 120 feet of sandbags to protect Bogue Court. Bags have to be removed in 5 years (year 9)

Year 5
Remove 100 feet of sandbags protecting structure **9685**. Lose structure.
Add 100 feet of sandbags to protect Bogue Court. Bags have to be removed in 5 years (year 10)
Construct 150 feet of sandbags to protect structure **0713**. Bags have to be removed in 2 years (year 7)

Year 6
Add 80 feet of sandbags to protect Bogue Court. Bags have to be removed in 5 years (year 11)
Remove 130 feet of sandbags protecting Bogue Court. Lose 100 feet of Bogue Court.
Construct 100 feet of sandbags to protect structure **1229**. Bags have to be removed in 2 years (year 8)
Construct 100 feet of sandbags to protect structure **1391**. Bags have to be removed in 2 years (year 8)
Lose vacant lot **0830**.
Construct 900-foot access road to west end of Bogue Court.

Year 7
Add 80 feet of sandbags to protect Bogue Court. Bags have to be removed in 5 years (year 12)
Construct 100 feet sandbags to protect structure **0849**. Bags have to be removed in 2 years (year 9)
Remove 100 feet of sandbags protecting Bogue Court. Lose 130 feet of Bogue Court.
Construct 100 feet sandbags to protect structure **1402**. Bags have to be removed in 2 years (year 9)
Remove 150 feet sandbags protecting structure **0713**. Lose structure.

Year 8
Remove 100 feet sandbags protecting structure **1229**. Lose structure.
Remove 100 feet sandbags protecting structure **1391**. Lose structure.
Remove 100 feet sandbags protecting Bogue Court. Lose 100 feet Bogue Court.
Construct 200 feet sandbags to protect structure **1439** and **1909**. Bags have to be removed in year 10.
Add 80 feet of sandbags to protect Bogue Court. Bags have to be removed in 5 years (year 13).

Year 9
Remove 120 feet of sandbags protecting Bogue Court. Lose 100 feet of Bogue Court.
Construct 100 feet sandbags to protect structure **1566**. Bags have to be removed in 2 years (year 11).
Remove 100 feet of sandbags from **1402**. Lose structure.
Remove 100 feet of sandbags from **0849**. Lose structure.

Year 10

Remove 100 feet of sandbags protecting Bogue Court. Lose 100 feet Bogue Court.
Construct 100 feet of sandbags to protect structure **2710**. Bags have to be removed in 2 years (year 12).
Remove 100 feet of sandbags protecting **1439**. Lose structure.
Remove 100 feet of sandbags protecting **1909**. Lose structure.

Inlet Drive

Year 0

Remove existing sandbags.
Lose structures **1963 & 2945.**

Year 1

Construct 100 feet sandbags to protect structure **3918**. Bags have to be removed in year 3.
Construct 150 feet of sandbags to protect Inlet Drive. Bags have to be removed in 5 years (year 6),

Year 2

Construct 100 feet of sandbags to protect structure **3093**. Bags have to be removed in year 4.

Year 3

Remove sandbags protecting structure **3918**. Lose structure.
Add 200 feet of sandbags to protect Inlet Drive. Bags have to be removed in 5 years (year 8).
Construct 100 feet of sandbags to protect structure **4059**. Bags have to be removed in year 5.

Year 4

Remove 100 feet of sandbags protecting **3093**. Lose structure.
Add 200 feet of sandbags to protect Inlet Drive. Bags have to be removed in 5 years (year 9).
Construct 100 feet of sandbags to protect structure **5037**. Bags have to be removed in year 6.

Year 5

Remove 100 feet sandbags protecting structure **4059**. Lose structure.
Add 170 feet of sandbags to protect Inlet Drive. Bags have to be removed in 5 years (year 10),

Year 6

Remove 150 feet of sandbags protecting Inlet Drive. Lose 50 feet Inlet Drive.
Construct 100 feet of sandbags to protect structure 1391. Bags have to be removed in year 8.
Remove 100 feet of sandbags protecting structure **5037**. Lose structure.
Construct 200 feet of sandbags to protect structures **6019** & **6190**. Bags have to be removed in year 8.
Add 150 feet of sandbags to protect Inlet Drive. Bags have to be removed in 5 years (year 11).
Construct 100 feet of sandbags to protect structure **8137**. Bags have to be removed in year 8.

Year 7

No sandbags required.

Year 8

Construct 300 feet of sandbags to protect **3317/3348**, **4401/5421**, & **2364**. Bags have to be removed in year 8.
Remove 100 feet of sandbags protecting structure **1391**. Lose structure.
Remove 200 feet of sandbags protecting structures **6019** & **6190**. Lose structures.
Remove 200 feet of sandbags protecting Inlet Drive. Lose 120 feet Inlet Drive.
Add 170 feet of sandbags to protect Inlet Drive. Bags have to be removed in 5 years (year 13).
Remove 100 feet of sandbags protecting structure **8137**. Lose structure.
Construct 100 feet of sandbags to protect structure **9200**. Bags have to be removed in year 10.

Year 9

Remove 200 feet of sandbags protecting Inlet Drive. Lose 100 feet of Inlet Drive.
Add 80 feet of sandbags to protect Inlet Drive. Bags have to be removed in 5 years (year 14).
Lose vacant lot **7153**.

Year 10

Remove 170 feet of sandbags protecting Inlet Drive. Lose 80 feet of Inlet Drive.
Remove 300 feet of sandbags protecting **3317/3348, 4401/5421, & 2364**. Lose structures.
Remove 100 feet of sandbags protecting structure **9200.** Lose structure.
Construct 200 feet of sandbags to protect structures **9273 & 0736**. Bags have to be removed in year 12.