

APPENDIX K  
VISUAL ANALYSIS

# VISUAL ANALYSIS

## EXISTING CONDITIONS

### Introduction

As part of the analysis for the potential replacement and/or reconstruction of the Sakonnet River Bridge, the visual features within the vicinity of the project limits were investigated.

### Visual Resources

The project area is located along existing RI 24, within the Sakonnet River valley and adjacent land areas of the towns of Portsmouth to the west and Tiverton to the east. To provide a framework for analyzing the visual environment, three landscape units can be distinguished within the project limits: (1) east approach, (2) Sakonnet River Bridge, and (3) west approach. The limits of the viewshed (that area visible from a given viewpoint or series of viewpoints) can also be divided as follows: (a) views *from* the highway and (b) views *of* the highway.

(1a) East Approach (from the highway): As a result of its location within a rock cut, the viewshed associated with the approach to the Sakonnet River Bridge from the east, within the Town of Tiverton, is restricted to the highway's immediate corridor. The dramatic vertical rock cut extends as much as seventy feet (70') above the roadway surface. At the point where Route 24 passes below the Route 77 (Main Road) interchange, the rock cut ends, and the view opens up to encompass adjacent residential land uses and distant views. However, it is also at this point where Route 24 transitions from its position below the surrounding land uses to an elevated position above the adjacent land uses. This tends to focus the driver's attention on the upcoming Sakonnet River Bridge structure and the views of the Sakonnet River and Mount Hope Bay.

(1b) East Approach (of the highway): As mentioned above, Route 24 transitions from a depressed position to an elevated position. Within the depressed area, the adjacent residential land uses and adjacent local roadways are significantly higher than Route 24, with limited views of the highway. Within the elevated position, the highway towers over the adjacent residential areas and local roadways. Its position affects light and shadow, air movement, and travel patterns for a distance of up to a half-mile. The scale of the bridge structural components and highway approaches is significantly larger than the adjacent land uses and therefore is visually dominant. The structural supports of the bridge are located within a potentially eligible historic district, identified as the "Riverside Drive Historic District-Tiverton." Although the construction of the existing bridge in 1954-1956 dramatically altered the area to the east of the historic district, the properties within the district remain "largely unchanged, retain a high degree of integrity and,...constitute a historically significant collection."

(2a) Sakonnet River Bridge Area (from the highway): The most extensive views are obtained from the Sakonnet River Bridge itself. To the north, the viewshed extends up past the Brayton Point Power Plant, into Swansea, Massachusetts, and Warren, Rhode Island. To the south, the viewshed extends a significant distance south along the Sakonnet River, and is more dependent upon weather

conditions than physical obstructions to the view. As a result of significant topographic differences between the two towns, the view from the bridge is markedly different from one side of the Sakonnet River to the other. On the Tiverton side, elevations rise rapidly from mean sea level to 240 feet. On the Portsmouth side, the terrain is fairly level, ranging from mean sea level to 25 feet (the exception to this is a rock outcrop to the south of Route 24, which rises to 77 feet). As a result, the viewshed to the east is limited to the area within the immediate vicinity of the Sakonnet River, yet the viewshed to the west extends towards the interior of Aquidneck Island. The visual quality of the view from the bridge is high, being a vivid landscape with a high degree of unity and intactness.

(2b) Sakonnet River Bridge Area (of the highway): Views of the highway and the bridge are most easily obtained from the Sakonnet River, from a position on one of the many commercial and recreational vessels that ply the river. Of note, however, is the fact that the Sakonnet River Bridge is not easily viewed from many land-bound viewpoints. The bridge's position, tucked into the river valley, tends to hide the bridge among the visual clutter of the shoreline, including buildings and the many sailboat masts within the nearby harbors. In addition, an elevated power line with large steel towers is located immediately to the north of the bridge. Also within the immediate bridge vicinity is an inactive "swing" bridge, which provided access across the Sakonnet River for the former "Old Colony and Newport Railroad." The towers for the power line are taller than any component of the Sakonnet River Bridge. The swing bridge, locked into the "open" position, is smaller than the Sakonnet River Bridge, but nonetheless contributes to the visual clutter of the area. The causeways that formerly provided rail access to the swing bridge from both Portsmouth and Tiverton also prevent the sweeping views north and south along the Sakonnet River that previously (prior to the mid 1860s) existed. The design of the existing bridge, with its 3-span, modified continuous Pratt truss section, maintains a low profile (approximately 110 feet at its highest point above the water surface). At some viewpoints, it is possible to simultaneously view both the Sakonnet River Bridge and the Mount Hope Bridge. The distinctive rectangular towers of the Mount Hope Bridge provide a contrast to the curved form of the Sakonnet River Bridge. However, as a result of similar colors (green) and materials (steel), the bridges provide a visual connection across the landscape.

(3a) West Approach (from the highway): Within the Town of Portsmouth, the Route 24 viewshed expands and contracts dependent primarily upon existing vegetation and structures. The view south extends out over the area known as "The Cove," which is a sheltered harbor area used for both recreational and commercial activities such as fishing and boating. The area contains several small islands and a public boat ramp. The view north contains views of residential areas, the Montaup Golf Course, and several fleeting glimpses of the Mount Hope Bridge. With a few exceptions, the visual quality of the area is moderate to high, displaying vividness, unity and intactness.

(3b) West Approach (of the highway): Once the bridge crosses the Sakonnet River into Portsmouth, the highway transitions from an elevated position to an at-grade position. As mentioned previously, the existing bridge was constructed in 1954-1956 within the middle of existing neighborhoods. This construction dramatically altered travel patterns and views on both the Tiverton and Portsmouth sides of the Sakonnet River. On the Portsmouth side, there are several residences that previously fronted on Railroad Avenue. However, the bridge structure was constructed within 30 feet of the facades of these residences and at an elevation that directly blocks their view to the south. Once

again, the bridge's position affects light and shadow, air movement, and travel patterns. The scale of the bridge structural components is significantly larger than the adjacent land uses and therefore is visually dominant. Once past the rock outcrop, views of the highway are gained from the water, the boat ramp area, the Montaup Golf Course, the RIDOT maintenance facility, the hotel, and the Cardi plant. Residential views of the highway are limited. The highway itself varies in pavement width to a maximum of 98 feet (two northbound lanes, two southbound lanes, plus breakdown lanes). The median is continuous Jersey barrier.

## **POTENTIAL IMPACTS**

### **No-Build and Bridge Rehabilitation Alternatives**

These alternatives would not affect the visual resources within the project limits.

### **New Bridge on Existing Alignment**

The existing views of and from the existing bridge alignment have been discussed above. The construction of a new bridge on the existing alignment would therefore not significantly change the limits of the current viewshed. However, there are at least two groups of options for the design of the new bridge: segmental concrete/box girder and cable stayed. The views of these two bridge groups would be substantially different, primarily due to the fact that the cable stayed bridge requires towers and the segmental concrete and box girder bridges do not.

As currently envisioned, the segmental concrete and box girder bridges would maintain a profile similar to the existing bridge structure, with the exception of the elimination of the curved center truss present on the existing bridge. These are clean-lined bridges, with few decorative details and minimal historical reference. As noted previously, views of the highway and the bridge are most easily obtained from the Sakonnet River, from a position on one of the many commercial and recreational vessels that ply the river. Otherwise, the Sakonnet River Bridge is not easily viewed from many land-bound viewpoints. The bridge's position, tucked into the river valley, tends to hide the bridge within the visual clutter of the shoreline, including buildings and the many sailboat masts within the nearby harbors. As a result, it is likely that if either the segmental concrete or box girder bridges are chosen, the Sakonnet River Bridge would "vanish" from many land-bound viewing positions. Dependent upon the pier type (solitary or paired), there is also likely to be fewer piers than currently, with less impact to views, shadows, and wind patterns.

At the other end of the visual spectrum is the cable stayed bridge. As a result of the requirement for towers to support the cables, cable stayed bridges can have a dramatic impact on the visual environment. Many of the bridges that have become regional landmarks and scenic elements, such as Tampa Bay's Sunshine Skyway Bridge, are examples of cable stayed bridges. The design options for the towers are almost limitless. The options include tower configuration (single centered pylon, A-frame, etc.), as well as a number of cabling arrangements (harp, radiating, fan, etc.). As currently envisioned, the cable stayed bridge proposed for the Sakonnet River valley would have two towers extending approximately 310 feet (94.5 m) above the water level of the Sakonnet River. This is a significant difference from the existing bridge, which rises only 110 feet (33.5 m) above the river

at its highest point. The towers would straddle the roadway with cables clustered toward the top of each of the towers. The cables would extend magnetic east and west along the roadway, either singly along the center of the bridge or along each side of the roadway. Should the cables be located along the center of the bridge, fewer but thicker diameter cables would be required. In addition, the height of the towers could potentially increase, as potentially, could the right-of-way (ROW) required. The visual effect would be similar to the sails on a sailboat. Should the cables be located to either side of the roadway, the number of cables required would double over of the center cable option; however, the diameter of the cables could be halved. Although it would appear that constructing a bridge with towers would significantly impact views of the bridge from the surrounding area, it should be noted that there are two existing large, steel utility towers north of the bridge that will remain under this alternative. The two proposed bridge tower locations would mimic the existing tower locations, which rise to height of approximately 200 feet (61 m) above the river. In addition, as mentioned previously, it is possible from some viewpoints to simultaneously view both the Sakonnet River Bridge and the Mount Hope Bridge. Should the cable stayed bridge option be chosen, the repetition of towers for the new Sakonnet River Bridge would provide a visual connection across the landscape between these two bridges. As a mid-span bridge is not efficient for many cable stayed bridges, it is likely that a cable stayed bridge for the Sakonnet River valley would be a long-span bridge. As a result, half as many piers would need to be used, as compared to the existing bridge structure.

### **New Bridge on Northern Alignment**

In this alternative (Alternative 4), the position of the highway and the Sakonnet River Bridge differs most significantly in alignment from the existing alignment within the Town of Tiverton. As with the existing alignment, RI 24 under this alignment will transition from a depressed position to an elevated position within this area. The scale of the bridge structural components and highway approaches will remain significantly larger than the adjacent land uses and therefore be visually dominant. In addition, this alternative will cut through an established neighborhood. This will result in the elimination of some residential structures, movement of the bridge structure farther away from some existing structures, and movement of the bridge structure closer to others. This will also apply to the Portsmouth side of the river, where at least three residential structures will be removed. Travel patterns will also be impacted due to the closure, reconnection and/or realignment of existing neighborhood streets on the Tiverton side. Dependent upon the individual viewer's perspective, this alternative may have a significant visual impact, although this impact will be localized. As discussed above, dependent upon the type of bridge structure chosen, the "long" views of the bridge will substantially differ within this alternative, as well. The position of one of the towers in the cable stayed bridge option immediately off the Tiverton shore may also impact the immediate abutters to the area, given that the tower may be as much as 300 feet (91.4 m) above the surface of Riverside Avenue.

### **New Bridge on Southern Alignment**

In this alternative (Alternative 5), the position of the highway and the Sakonnet River Bridge differs most significantly in alignment from the existing alignment within the Town of Tiverton. As with the existing alignment, RI 24 under this alignment will transition from a depressed position to an

elevated position within this area. The scale of the bridge structural components and highway approaches will remain significantly larger than the adjacent land uses and therefore be visually dominant. In addition, this alternative will cut through established neighborhoods, although not to the same extent as Alternative 4. This alternative will also result in the elimination of some residential structures, movement of the bridge structure farther away from some existing structures, and movement of the bridge structure closer to others. This will apply to both sides of the river, although it does not appear that any residential structures will be removed on the Portsmouth side. It should be noted that although fewer residences will be impacted by this alternative, construction of this alternative will be within the proposed limits of the “Riverside Drive Historic District” in the Town of Tiverton. On the Portsmouth side there are several residences where the existing bridge structure is located within 30 feet (9.1 m) of the facades of these residences and at an elevation that directly blocks their view to the south. This alternative will relocate the highway a minimum of 80 feet (24.4 m) from the closest facade. Travel patterns will also be impacted due to the closure, reconnection and/or realignment of existing neighborhood streets on the Tiverton side. Dependent upon the individual viewer’s perspective, this alternative may have a significant visual impact, although this impact will be localized. As discussed above, dependent upon the type of bridge structure chosen, the “long” views of the bridge will substantially differ within this alternative, as well. The position of one of the towers in the cable stayed bridge option immediately off the Tiverton shore may also impact the immediate abutters to the area, given that the tower may be as much as 300 feet (91.4 m) above the surface of Riverside Avenue.

### **Barrier Element**

A barrier element analysis has been completed for the bridge and highway sections to determine the safety requirements as well as provide for the best available aesthetics and viewing from the vehicles on the bridge. The preferred alternative utilizes a 36-inch (91 cm) high main element with a top rail extending 42- inches (107 cm). This barrier would allow motorists to have a better view of the Sakonnet river and Mount Hope Bay than they currently enjoy.

### **New Bridge Structure Types**

The various new bridge structure types, relative to visual resources, have been discussed in detail under the different alternatives.

### **Potential Toll Plaza**

The inclusion of a toll plaza in the vicinity of the existing weigh station would result in impacts to the visual environment. These impacts are related not only to the construction of the toll booth structure itself, but also to the construction of the service road proposed to provide non toll access to the existing public boat launch. These two components will be discussed separately. The toll booth structure is proposed to be located in an area that, with a few exceptions, displays a visual quality that is moderate to high, displaying vividness, unity and intactness. While there are many opportunities for sensitive architectural design of the toll booth structure itself, one of the issues of concern is the impact that the toll booth will have on the actions and attention of drivers traveling on RI 24. Due to the requirements of stopping distances, slowing traffic, and accessing toll fees,

drivers will necessarily be significantly diverted from the high-value views associated with “The Cove,” thereby lessening its visual value. In addition, the roadway cross-section will be significantly increased, reducing the visual buffers to adjacent sensitive receptors, such as the golf course and fishing areas. Furthermore, although the current lighting level is relatively low, the lighting requirements of the toll booth area will be significantly higher, potentially resulting in impacts to abutting residences and wildlife.

The proposed access road will originate from the existing Cardi plant access road, off of Boyd Lane, south of Route 24 and continue magnetic east to the existing boat ramp access road. The view from the proposed access road will provide an excellent view of the area known as “The Cove.” However, as mentioned above regarding the toll plaza, views of the highway gained from the water will be more accessible, potentially resulting in the reduction of the aesthetic values associated with “The Cove.”