

State Route 237/Middlefield Road Improvements Alternatives Analysis

Alternative 1 – Westbound Slip On-Ramp

Alternative 1 (Figure 1) proposes construction of a slip on-ramp to westbound State Route 237 from westbound Frontage Road between Maude Avenue and Middlefield Road. With the addition of the new slip ramp, the westbound through movement at the Frontage Road/Middlefield Road intersection would no longer be needed; therefore, only left-turn and right-turn movements would be permitted. To discourage violations, an island would be added at the intersection. Eliminating the through movement would reduce conflicting traffic movements and remove the movement associated with the highest number and greatest severity of crashes (westbound Frontage Road/southbound Middlefield Road at the eastbound ramp). The slip ramp would be designed to conform to the existing Middlefield Road undercrossing structure. Lane configurations along Middlefield Road between Ferguson Drive and eastbound Frontage Road would be modified, although the number of through lanes would remain unchanged.

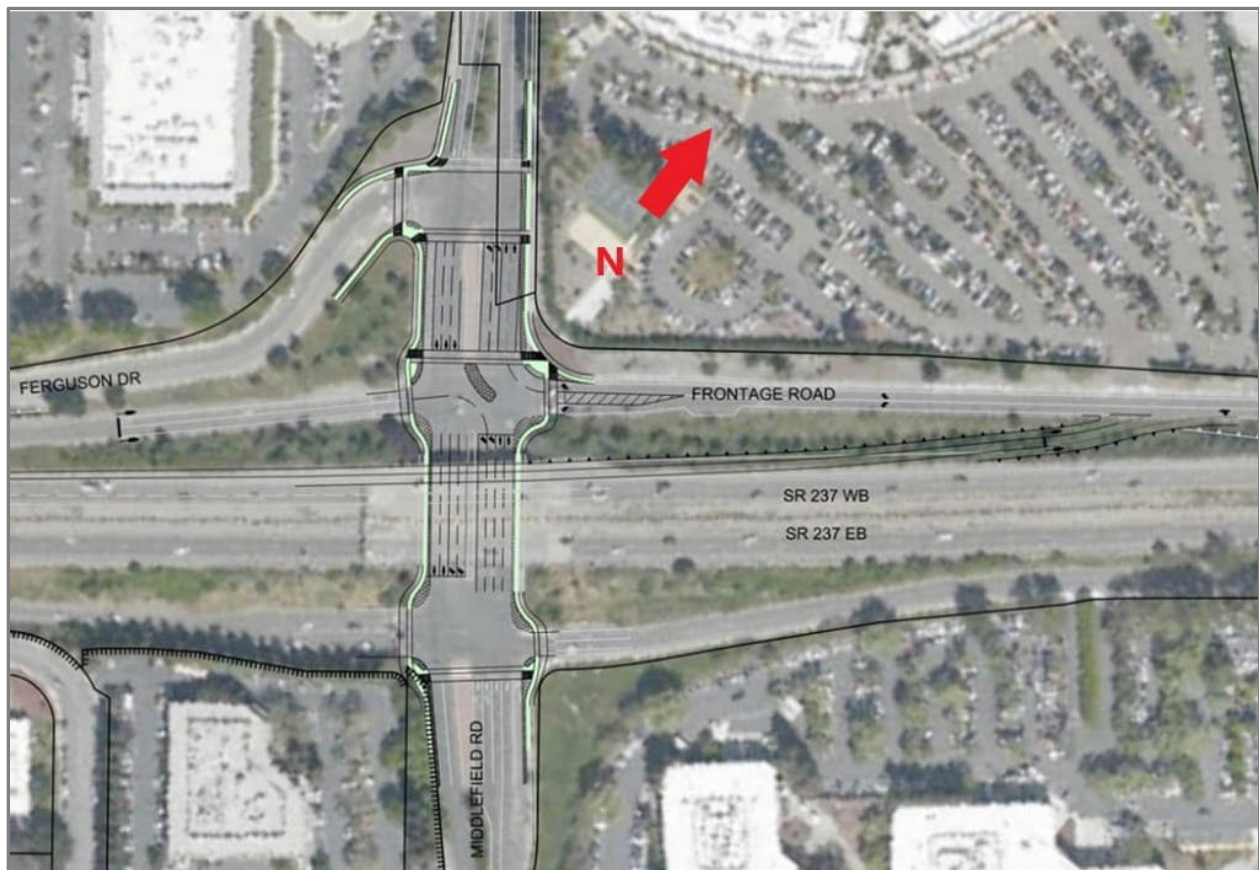


Figure 1 – Alternative 1 – Westbound Slip On-Ramp

Proposed pedestrian and bicycle improvements include new Class IV bikeways with adjacent six-foot-wide sidewalks in both directions along Middlefield Road (Figure 2), as well as protected intersections at Ferguson Drive, Frontage Road, and the eastbound SR 237 off-ramp.

This alternative would have little to no right-of-way impact, and the estimated order-of-magnitude construction cost is approximately \$11.9 million in 2020 dollars.

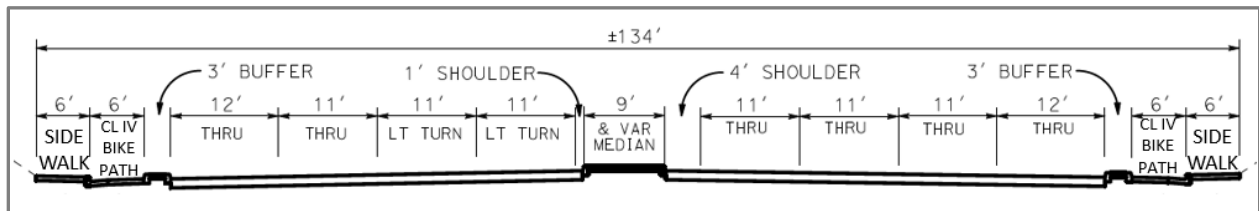


Figure 2 – Alternative 1 – Middlefield Road Cross-Section

Alternative 2 – Westbound On-Ramps Improvements

Alternative 2 (Figure 3) is similar to Alternative 1 in that it includes construction of a new slip ramp. In addition, Alternative 2 proposes eliminating the westbound Frontage Road through and left-turn movements by extending the median island along Middlefield Road. Removing these movements would reduce conflicting traffic movements at the intersection and eliminate the vehicle movements associated with the highest number and greatest severity of crashes at the Frontage Road/Middlefield Road intersection.

This alternative also relocates the existing westbound on-ramp entrance by closing ramp access at Middlefield Road and constructing a hook ramp from Ferguson Drive. Lane configurations along Middlefield Road between Ferguson Drive and eastbound Frontage Road would be modified; however, the number of through lanes would remain unchanged.

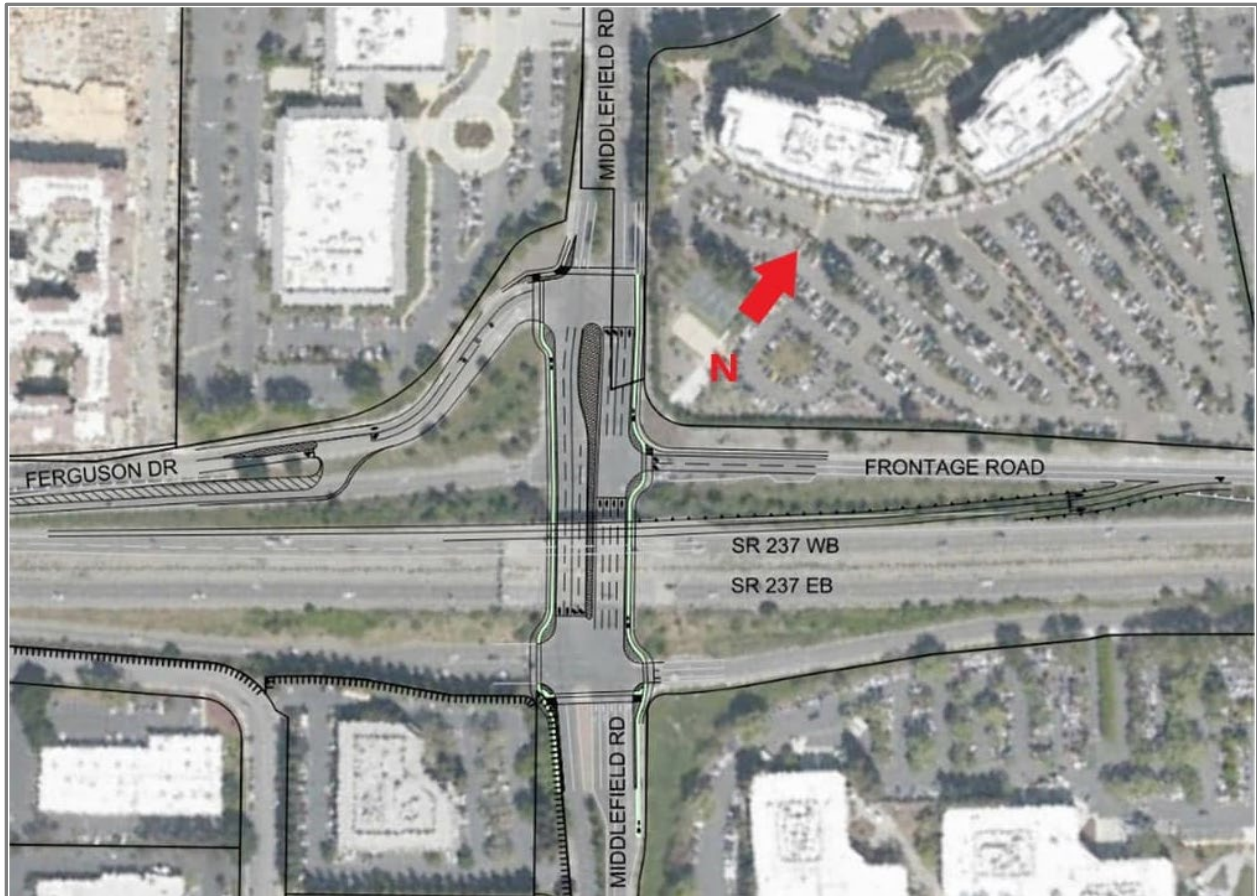


Figure 3 – Alternative 2 – Westbound On-Ramps Improvements

Proposed pedestrian and bicycle improvements include a combination of Class II and Class IV bikeways with adjacent six-foot-wide sidewalks along Middlefield Road (Figure 4), as well as a partially protected intersection at Middlefield Road and the eastbound Frontage Road.

Alternative 2 would have little to no right-of-way impact, and the estimated order-of-magnitude construction cost is approximately \$12.4 million in 2020 dollars.

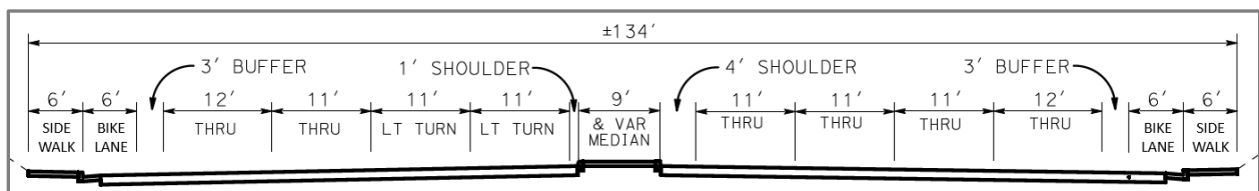


Figure 4 – Alternative 2 – Middlefield Road Cross-Section

Alternative 3 – Pedestrian and Bicyclists Improvements

Alternative 3 (Figure 5) represents a minimal improvement approach focused primarily on reconfiguring the lanes along Middlefield Road between Ferguson Drive and the eastbound SR 237 off-ramp/Frontage Road to accommodate enhanced pedestrian and bicycle facilities (Figure 6).



Figure 5 – Alternative 3 – Pedestrian and Bicycle Facilities Improvements

Proposed pedestrian and bicycle improvements include new Class IV bikeways with adjacent six-foot-wide sidewalks in both directions along Middlefield Road (Figure 6), as well as protected intersections at westbound Frontage Road, eastbound Frontage Road, and Ferguson Drive.

Alternative 3 would have little to no right-of-way impact, and the estimated order-of-magnitude construction cost is approximately \$2.4 million in 2020 dollars.

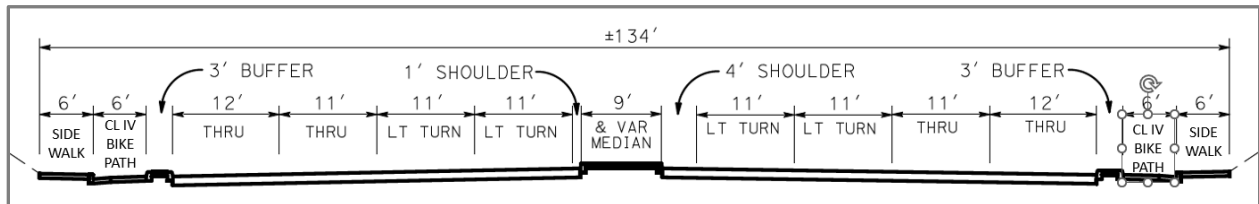


Figure 6 – Alternative 3 – Middlefield Road Cross-Section

Alternative 4 – Frontage Road/Ferguson Drive Realignment

Alternative 4 (Figure 7) proposes realigning Frontage Road to intersect with Ferguson Drive at Middlefield Road. This improvement would eliminate the eastern leg of the existing westbound Frontage Road/Middlefield Road intersection, thereby removing the vehicle movement associated with the highest number and greatest severity of collisions (westbound Frontage Road/Middlefield Road broadside crashes). No modifications to the on-ramps are proposed, and the existing westbound on-ramp would remain in place. In addition, this alternative would not affect the existing Middlefield Road undercrossing structure.



Figure 7 – Alternative 4 – Frontage Road and Ferguson Drive Realignment

Proposed pedestrian and bicycle improvements include new Class IV bikeways with adjacent six-foot-wide sidewalks (Figure 8), as well as a squared-up intersection at Ferguson Drive/Frontage Road and Middlefield Road.

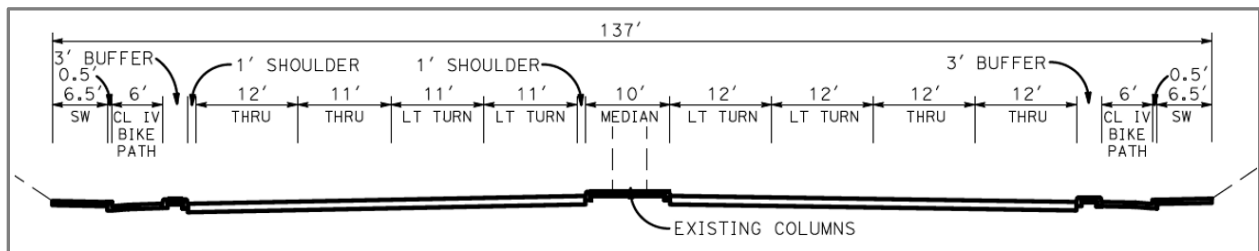


Figure 8 – Alternative 4 – Middlefield Road Cross-Section

This alternative would require acquisition of approximately 42,000 square feet of right-of-way from the property at 690 East Middlefield Road. The estimated order-of-magnitude cost is approximately \$19.8 million in 2020 dollars, assuming \$350/square foot for right of way.

Alternative 5B – Loop On-Ramp (From PSR)

Alternative 5B (Figure 9) proposes a new loop on-ramp to westbound State Route 237, which would eliminate the existing four-legged intersection at westbound Frontage Road and Middlefield Road. By removing the eastern leg of the current intersection, this alternative would eliminate the vehicle movement associated with the highest number and greatest severity of crashes (westbound Frontage Road/Middlefield Road broadside collisions). This alternative would not affect the existing Middlefield Road undercrossing structure. Lane configurations along Middlefield Road between Ferguson Drive and eastbound Frontage Road would be modified; however, the number of through lanes would remain unchanged.

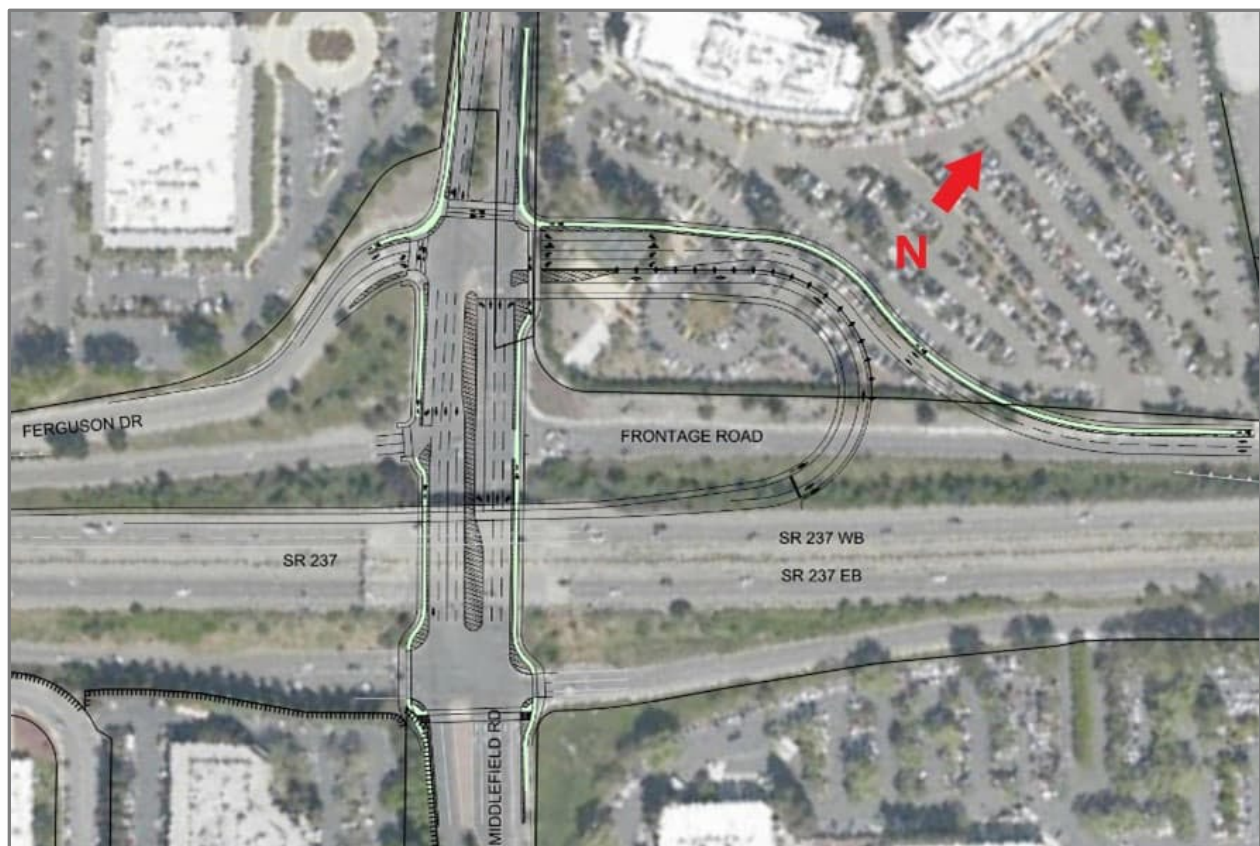


Figure 9 – Alternative 5B – Loop On-Ramp

This alternative also proposes substantial pedestrian and bicycle improvements, including new Class IV bikeways with adjacent six-foot-wide sidewalks (Figure 10), squared-up intersections,

and protected intersections at the new Middlefield Road/westbound Frontage Road intersection and at eastbound Frontage Road.

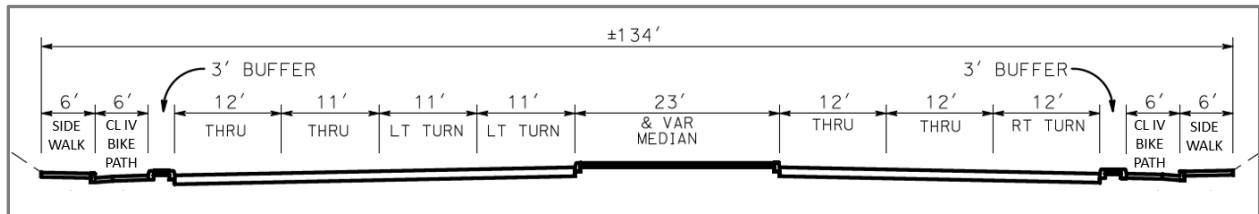


Figure 10 – Alternative 5B – Middlefield Road Cross-Section

Implementation of this alternative would require the acquisition of approximately 110,000 square feet of right-of-way from the property at 690 East Middlefield Road. As a result, the estimated order-of-magnitude construction cost is approximately \$54.5 million in 2020 dollars, assuming a right-of-way cost of \$350 per square foot.

Alternative 5C – Roundabout (From PSR)

Similar to Alternative 5B, Alternative 5C (Figure 11) proposes a new loop on-ramp to westbound State Route 237, which would eliminate the existing four-legged intersection at westbound Frontage Road and Middlefield Road. However, instead of constructing a conventional four-legged intersection at the realigned westbound Frontage Road/Middlefield Road intersection, as proposed under Alternative 5B, Alternative 5C would introduce a roundabout.

By removing the eastern leg of the existing Frontage Road/Middlefield Road intersection, Alternative 5C would eliminate the vehicle movement associated with the highest number and greatest severity of collisions (westbound Frontage Road/Middlefield Road broadside crashes). In addition, this alternative would conform to the existing Middlefield Road undercrossing structure. Lane configurations along Middlefield Road between Ferguson Drive and eastbound Frontage Road would be modified; however, the number of through lanes would remain unchanged.

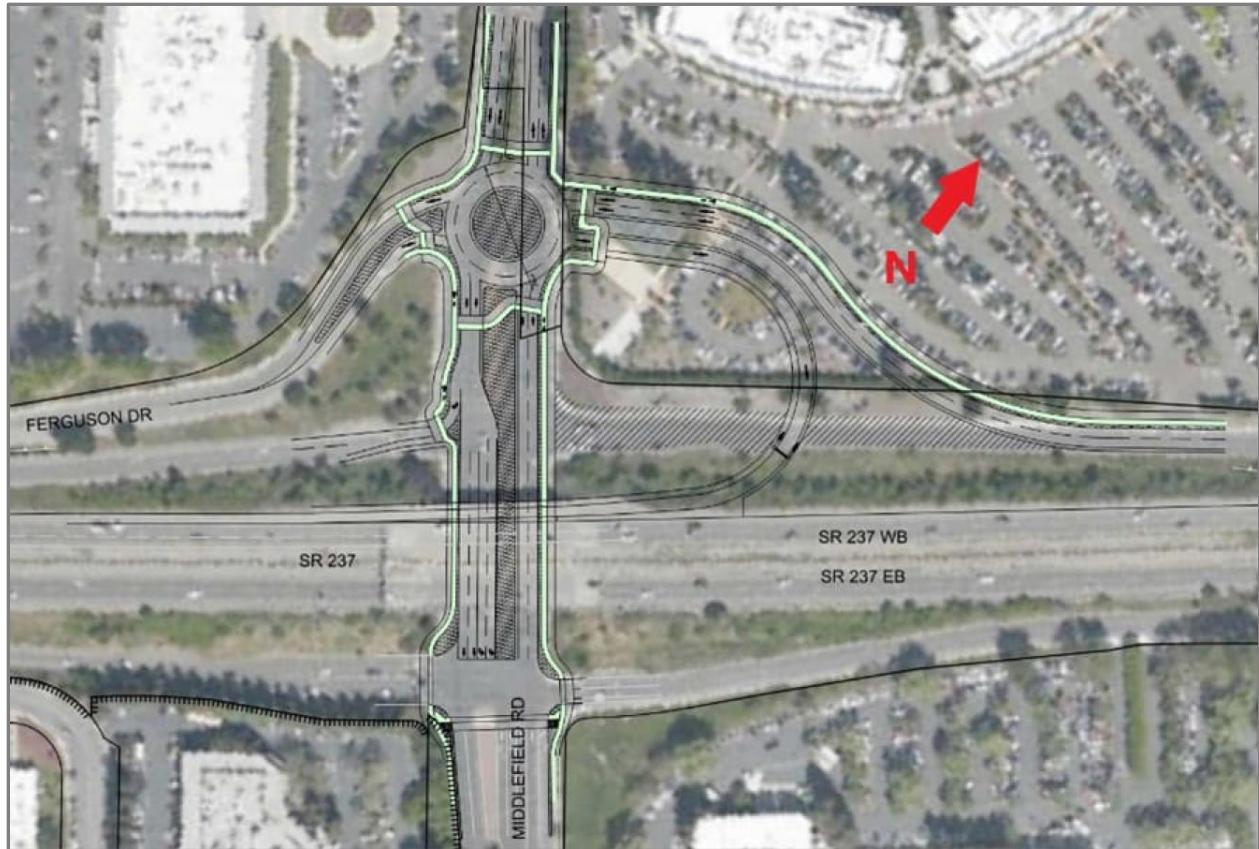


Figure 11 – Alternative 5C – Roundabout

This alternative also includes substantial pedestrian and bicycle improvements, including new Class IV bikeways with adjacent six-foot-wide sidewalks (Figure 12), as well as a protected intersection at eastbound Frontage Road.

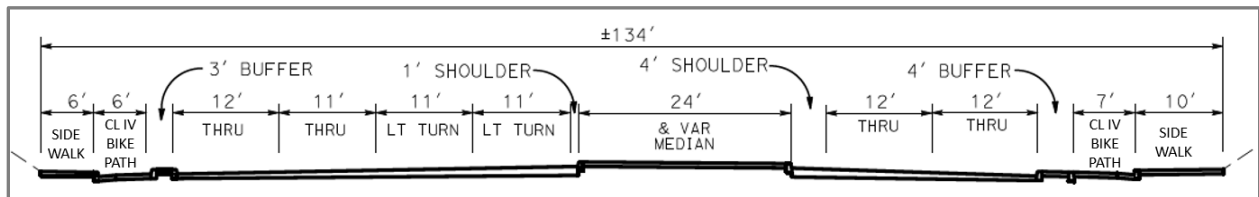


Figure 12 – Alternative 5C – Middlefield Road Cross-Section

Implementation of Alternative 5C would require the acquisition of approximately 95,000 square feet of right-of-way from the property at 690 East Middlefield Road. As a result, the estimated order-of-magnitude construction cost is approximately \$48.9 million in 2020 dollars, assuming a right-of-way cost of \$350 per square foot.