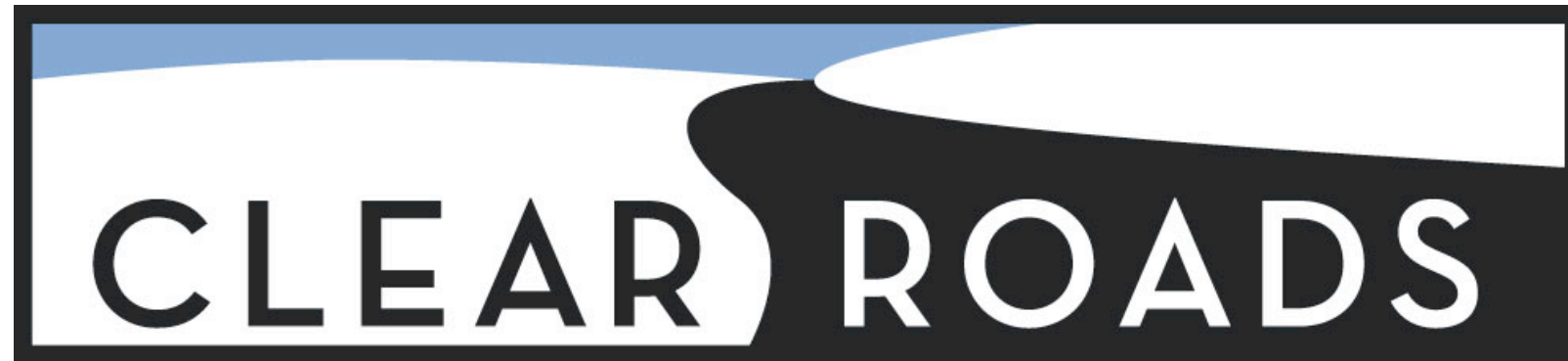


# Intersection and Interchange clearing and Instructions



research for winter highway maintenance

**Developed by:**

Southern Illinois University – Edwardsville (SIUE)

Western Transportation Institute (WTI)

MLT Group

Monte Vista Associates, LLC

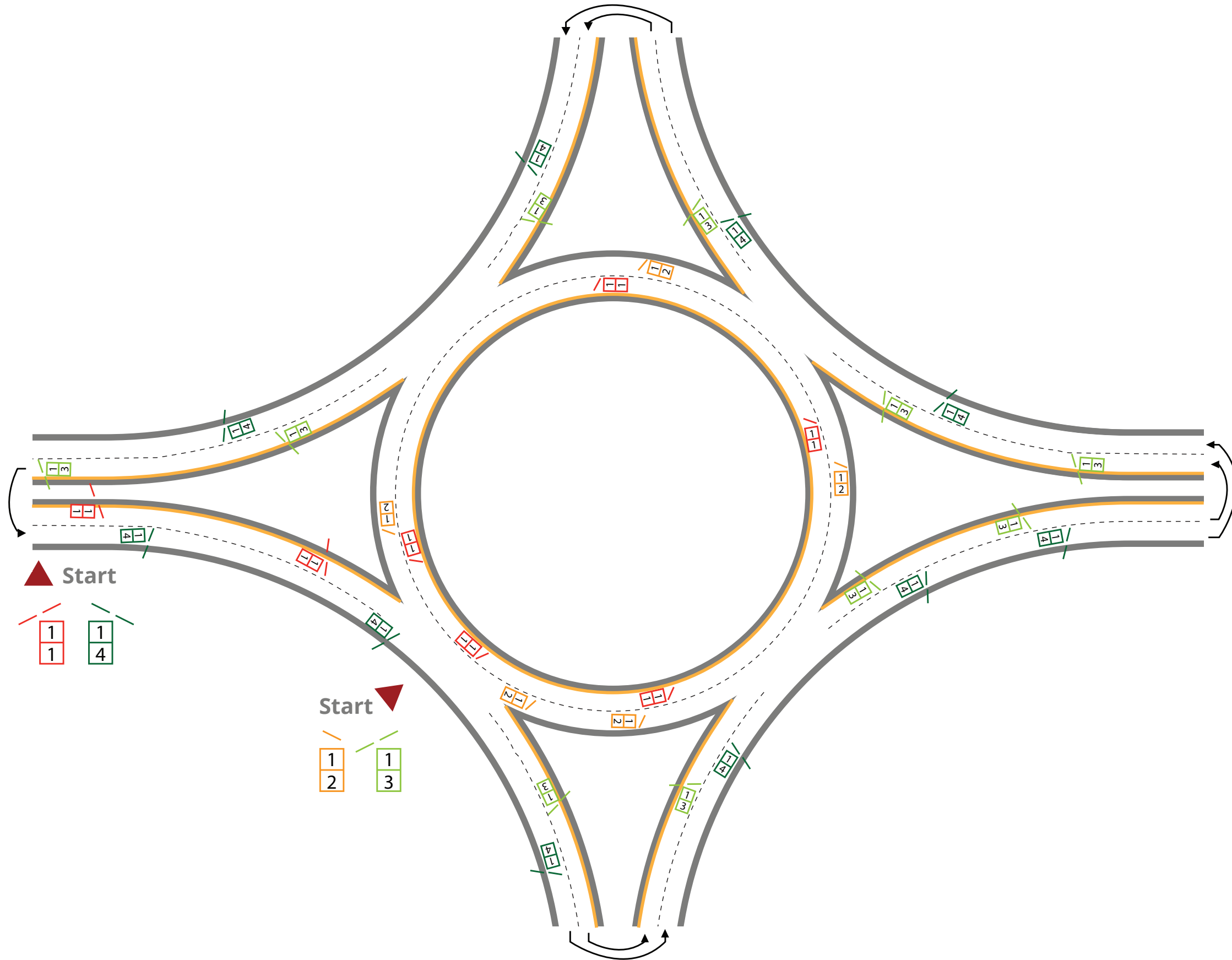
**October, 2018**

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# Roundabout Intersection



**Road**

4' 12' 12' 4'

---

**14' clear**

plow  
wing

truck# 1  
pass# 3

---

**11' clear**

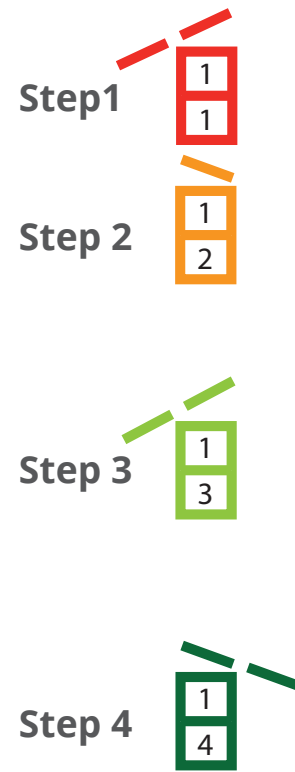
plow

truck# 1  
pass# 2



**Instructions for Use:** In order to distinctly show multiple passes and trucks in the diagram, individual truck numbers, pass numbers, and plow configurations were depicted on the right. A typical clear width is 11' for a front plow only and 14' for a front plow and a wing plow. The starting point of a pass is indicated by ◀ and a U-turn is depicted by ↶ in the diagram.

**General Notes:** Only one truck is utilized, the circle is cleared first before the legs are cleared.

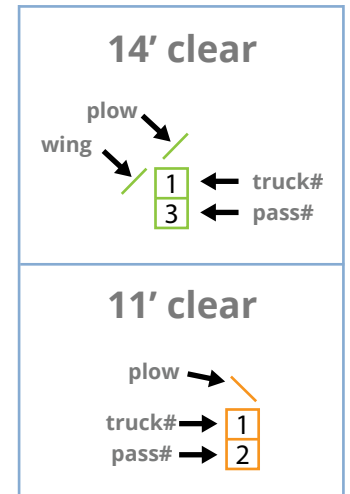


Approach roundabout in left lane on one approach and begin **Pass 1/1**, front plow angled left, left wing plow extended over shoulder. Enter roundabout, retract left wing plow, **reverse** front plow to right, stay in left lane and circle complete around.

At point of first entry, shift to right lane, front plow only still angled to right and begin **Pass 1/2**, stay in right lane and circle completely around.

- At point of first entry, shift to left lane of ramp and begin **Pass 1/3**.
- **Reverse** front plow to angle left, extend left wing over shoulder.
- Turn around at end-point and continue **Pass 1/3** in the opposite direction left lane.
- Before entering the intersection, retract left wing plow and angle front plow to dump the snow.
- While passing through the intersection, "square" the front plow to avoid drag snow onto cleared outer lane of the roundabout.
- Extend left wing plow after passing the intersections. Repeat the step to clear left lane of all ramps.

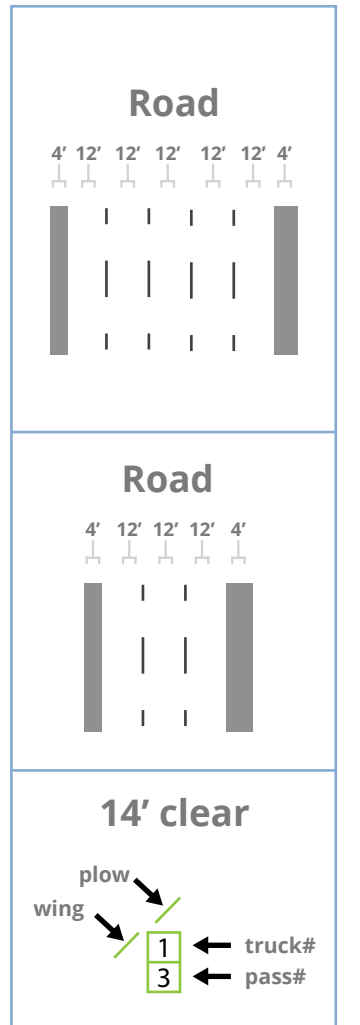
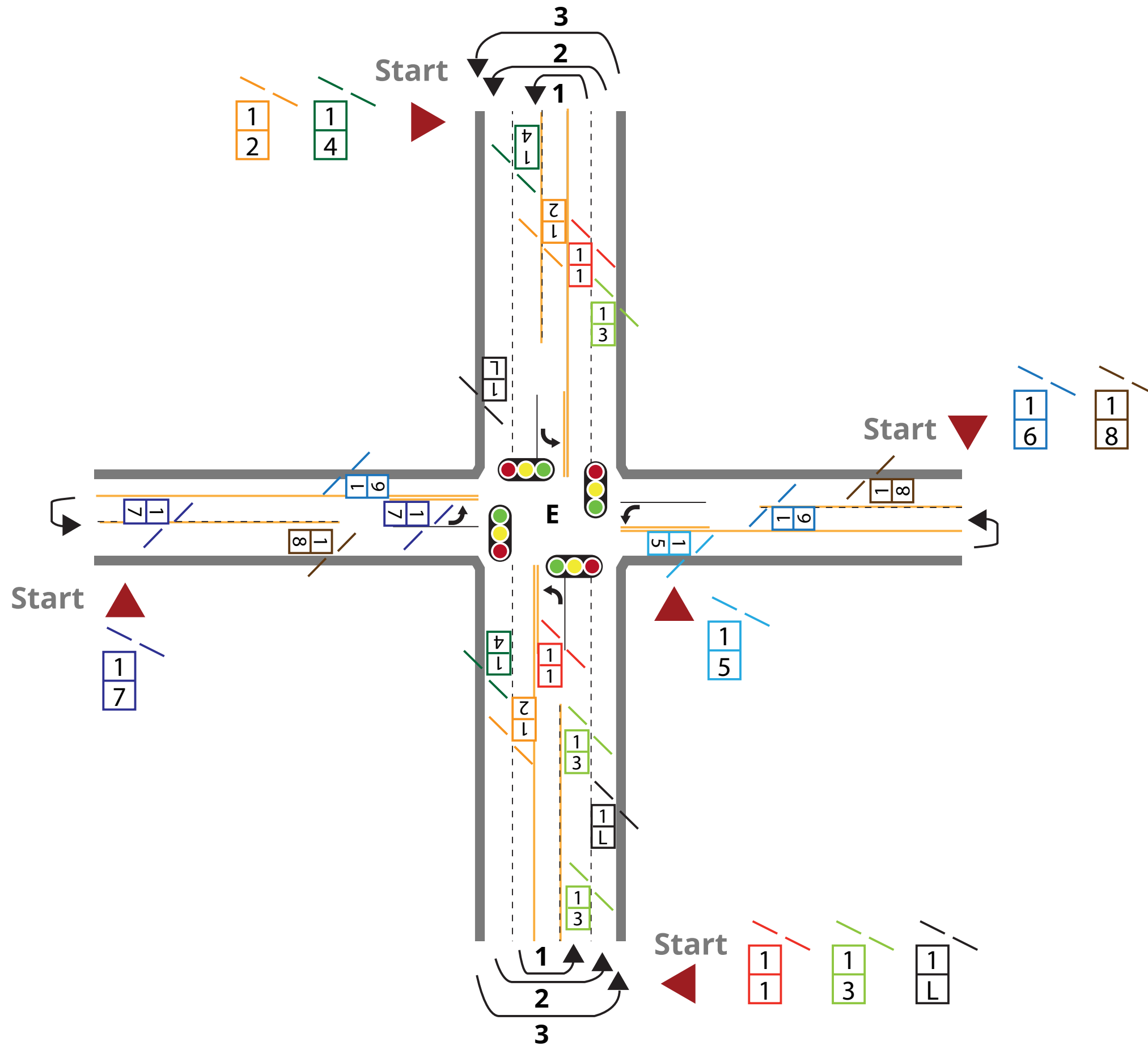
At initial start point, turn around and begin **Pass 1/4** in right lane of ramp, **reverse** front plow to angle right and extend right wing plow over shoulder. Follow same pattern in **Pass 1/3** to clear right lane of all ramps.





# 4 Leg Intersection

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1

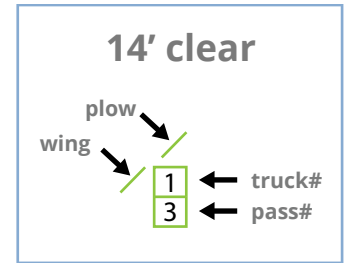


# 4 Leg Intersection


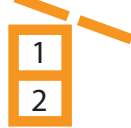
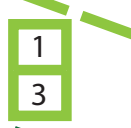


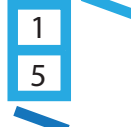
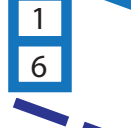
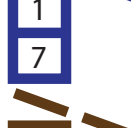



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**Instructions for Use:** In order to distinctly show multiple passes and trucks in the diagram, individual truck numbers, pass numbers, and plow configurations were depicted on the right. A typical clear width is 11' for a front plow only and 14' for a front plow and a wing plow. The starting point of a pass is indicated by ◀ and a U-turn is depicted by ↶ in the diagram.

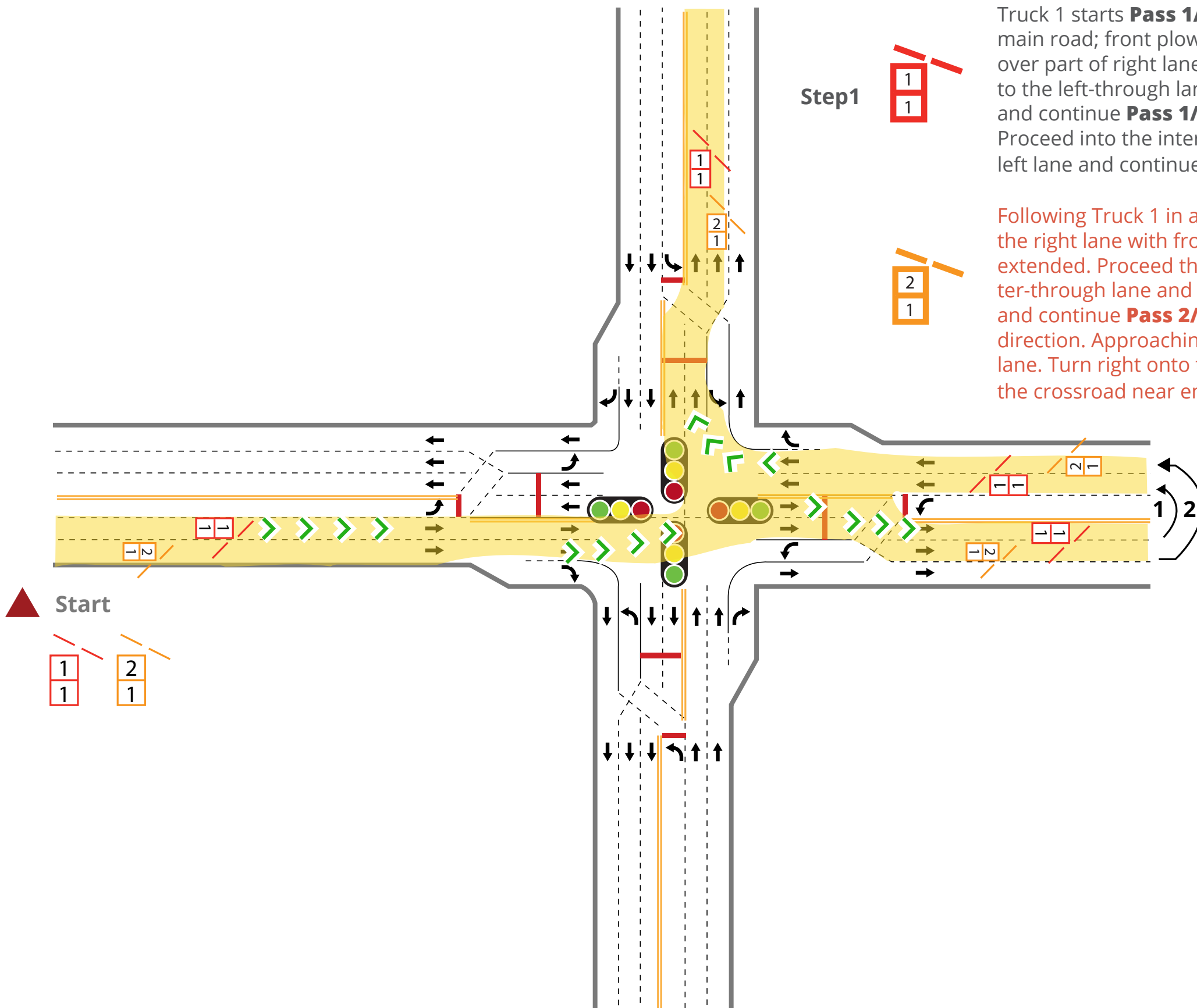


**General Notes:** Using one single truck, nine passes are needed to clearing the intersection in this example.

- Step 1**  Single truck with front and right wing plow begins **Pass 1/1** in one direction of the main road, clearing the inside (left turn) lane; instead of making a left turn, it passes straight across the intersection then resumes clearing the inside (left) through lane;
- Step 2**  At the turn-around point it crosses over and begins **Pass 1/2** in the inside (left turn) lane of the opposite direction; again, it passes straight across the intersection then resumes clearing the inside (left) through lane;
- Step 3**  The truck turns around and begins **Pass 1/3** by shifting to the left through lane, with plows still angled to the right. It continues through the intersection to clear the right through lane;
- Step 4**  Turning around again; it begins **Pass 1/4** in the opposite direction left through lane; the truck passes straight across the intersection to clear the right through lane
- Step 5**  Truck turns again and begins **Pass 1/L** clearing the shoulder while overlapping part of the outside lane on the main road in both directions;
- Step 6**  The truck begins **Pass 1/5** in the minor road through-lane in one direction;
- Step 7**  Turning around, it begins **Pass 1/6** in the minor road left-turn lane of the opposite direction; as it plows through the intersection it returns to the through lane;
- Step 8**  Turning around, it begins **Pass 1/7** in the minor road left-turn lane of the other direction; as it plows through the intersection it returns to the through lane;
- Step 9**  Turning around; it begins **Pass 1/8** in the minor road through lane in one direction then turns and completes the pass in the opposite direction back through the intersection.



# Displaced Left Turn 1/4



Step 1



Truck 1 starts **Pass 1/1** in center lane on one approach of the main road; front plow angled right and right-wing plow extended over part of right lane. Proceed through intersection, then shift to the left-through lane. Continue to far end-point. Turn around and continue **Pass 1/1** in center lane of opposite direction. Proceed into the intersection, then turn right onto the crossroad left lane and continue to the crossroad near end-point.



Following Truck 1 in a formation, Truck 2 starts **Pass 2/1** in the right lane with front plow angled right and right wing-plow extended. Proceed through the intersection, shift to the center-through lane and continue to the far end-point. Turn around and continue **Pass 2/1** in the right-through lane of the opposite direction. Approaching the intersection, shift to the right-turn lane. Turn right onto the crossroad center lane and continue to the crossroad near end-point.

Road								
4'	12'	12'	12'	12'	12'	12'	12'	4'

Road								
4'	12'	12'	12'	12'	12'	12'	12'	4'

14' clear

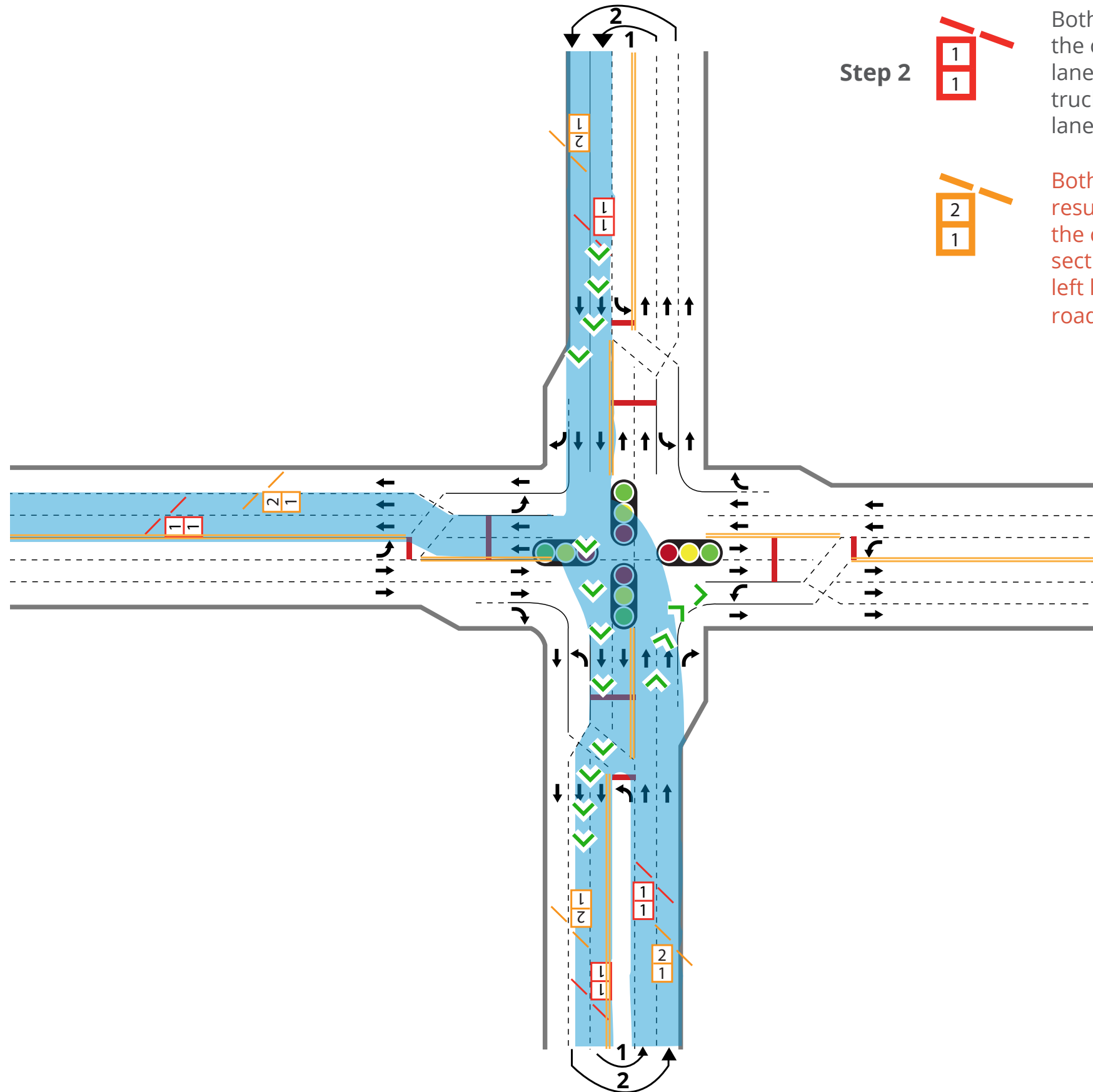
truck# → 1  
pass# → 1



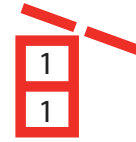
# Displaced Left Turn 2/4



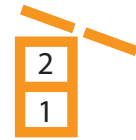
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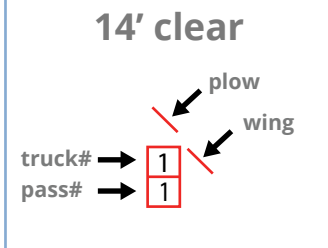
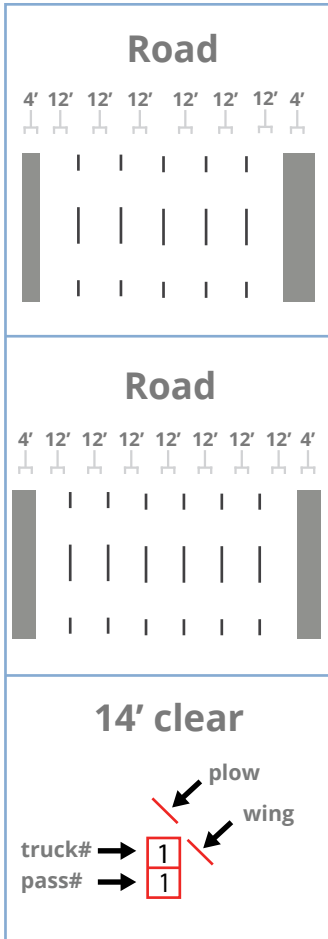
Step 2



Both trucks turn around and continue **Passes 1/1** and **2/1** on the crossroad, keeping in the formation. Truck 1 in the center lane and truck 2 in the right lane. Crossing the intersection, truck 1 shifts to the left lane and truck 2 shifts to the center lane.



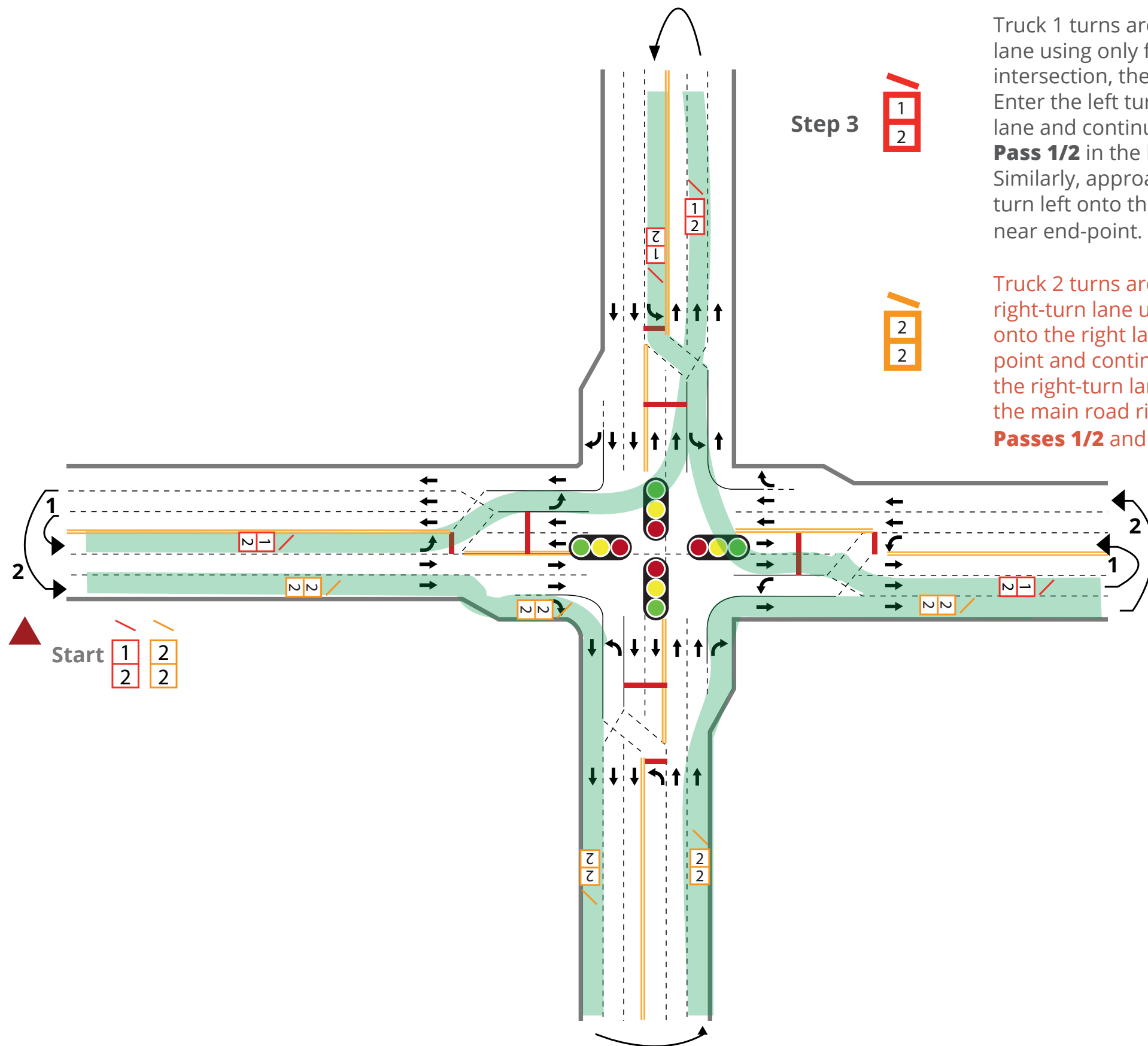
Both trucks turn around at the cross road far end-point and resume **Passes 1/1** and **2/1** in the opposite direction. Truck 1 in the center lane and truck 2 in the right lane. Entering the intersection, both trucks turn left on the crossroad. Truck 1 shifts to left lane, truck 2 shifts to center lane, and continue to the crossroad near end-point. This completes **Passes 1/1** and **2/1**.







# Displaced Left Turn 3/4

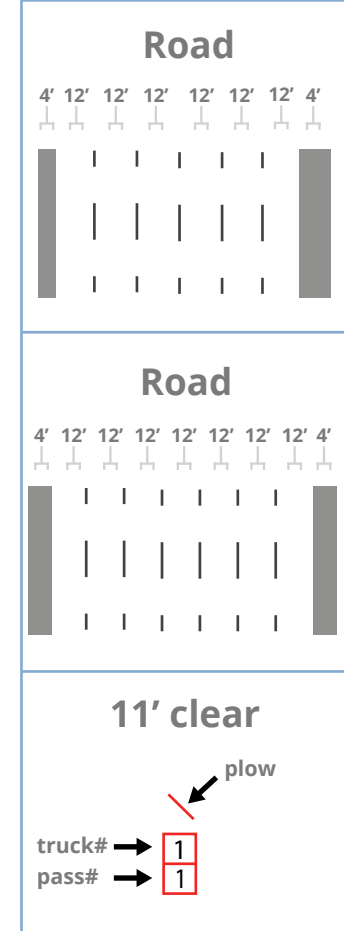


Step 3



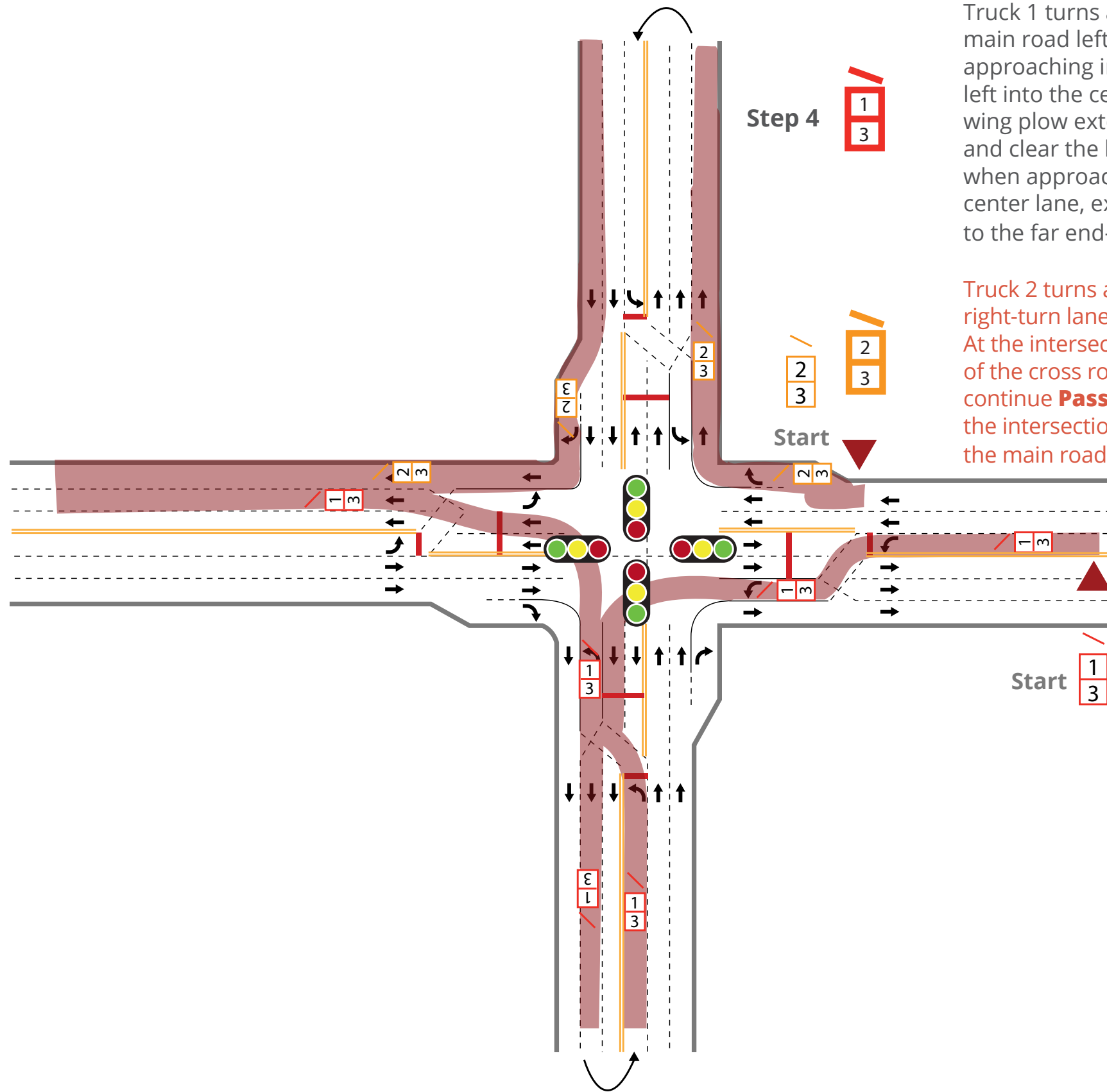
Truck 1 turns around and begins **Pass 1/2** in the main road left lane using only front-plow angled right. When approaching the intersection, the left lane turns into a dedicated left turn lane. Enter the left turn lane and turn left onto the crossroad center lane and continue to far end-point. Turn around and continue **Pass 1/2** in the left lane on opposite direction of the main road. Similarly, approaching the intersection, enter the left-turn lane, turn left onto the main road center lane and continue to the near end-point.

Truck 2 turns around and begins **Pass 2/2** in the main road right-turn lane using only front-plow angled right. Turn right onto the right lane of the cross road. Turn around at the end-point and continues **Pass 2/2** in the opposite direction. Enter the right-turn lane, turn right at the intersection and continue in the main road right lane to the near end-point. This completes **Passes 1/2 and 2/2**.



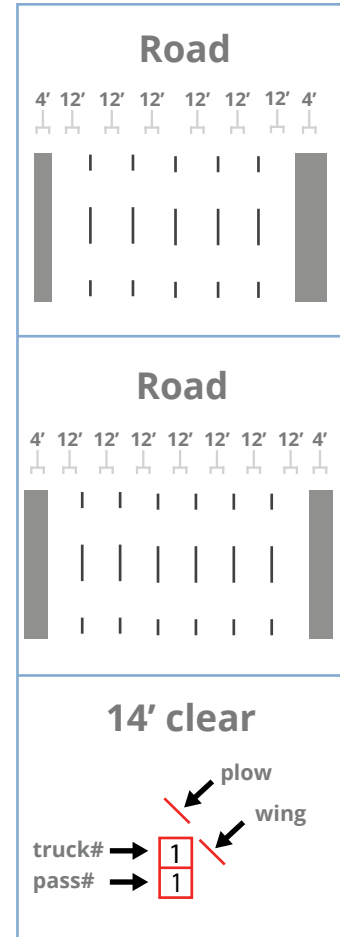


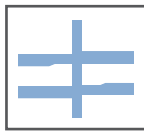
# Displaced Left Turn 4/4



Truck 1 turns around at near end-point and begins **Pass 1/3** in the main road left lane (which turns into a dedicated left turn lane when approaching intersection) using only front-plow angled right. Turn left into the center lane on the crossroad and continue with right-wing plow extended. At the cross road near end-point, turn around and clear the left lane (which turns into a dedicated left turn lane when approaching intersection). Then turn left into the main road center lane, extend rightwing plow and continue in the center lane to the far end-point.

Truck 2 turns around at near end-point and begins **Pass 2/3** in the right-turn lane on the main road using only front-plow angled right. At the intersection, turn right and continues **Pass 2/3** in the right lane of the cross road. At the cross road near end-point, turn around and continue **Pass 2/3** in the right turn lane on the opposite direction. At the intersection, turn right and continue **Pass 2/3** in the right lane of the main road to the far end-point. This completes all passes.

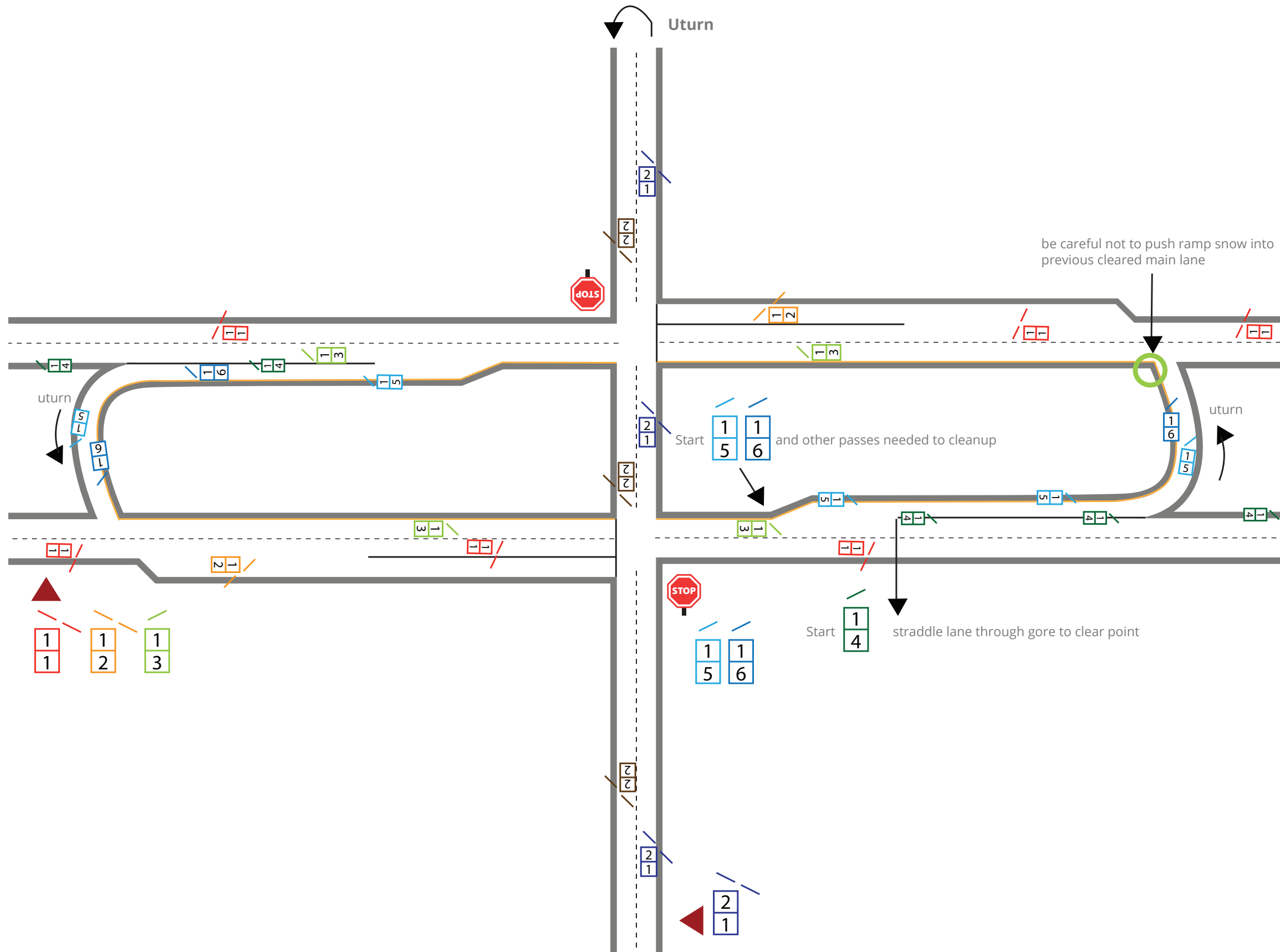




# Median U-Turn Intersection



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**Ramp**  
4' 16' 8'

**Road**  
4' 12' 12' 4'

**14' clear**  
plow wing truck# 1 pass# 3

**11' clear**  
plow truck# 1 pass# 2



# Median U-Turn Intersection



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**Instructions for Use:** In order to distinctly show multiple passes and trucks in the diagram, individual truck numbers, pass numbers, and plow configurations were depicted. A typical clear width is 11' for a front plow only and 14' for a front plow and a wing plow as shown below on the right. The starting point of a pass is indicated by ◀ and a U-turn is depicted by ↶ in the diagram.

**General Notes:** Two trucks are used; one for the four-lane main road and the other for the two-lane minor road. Each has a front plow and a right-wing plow.



**Truck #1 Major road - Start Pass 1/1** on the major road at the near end-point in the right- through lane. Front plow angled right and wing plow extended. At the far end-point, turn around and continue Pass 1/1 in the outside lane of the opposite direction.



At the near end-point, turn around and begins **Pass 1/2** in the dedicated right-turn-only lane; at the intersection, move into the outside through lane and continue to the far end-point. Turn around and clears the dedicated right-turn lane in the opposite direction. At the intersection, move into the outer through lane and continues to the near end-point.



Turn around and begin **Pass 1/3** in the left- through lane; front plow angled left and wing-plow tucked in. At the far end-point, turn around and continue **Pass 1/3** in the left-through lane of the opposite direction.



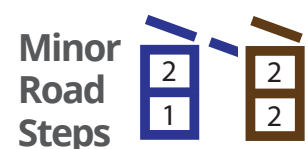
Turn and proceed in the left-through lane; cross the intersection to begin **Pass 1/4**, shifting left to clear the gore at the U-turn entrance. As the gore ends, proceed along the left shoulder, front plow angled left, to the far end-point. Turn around and continue **Pass 1/4** in the left-through lane of the opposite direction. Cross the intersection, shift left to clear the gore area by the U-turn, then proceed straight along the left shoulder to the near end-point.



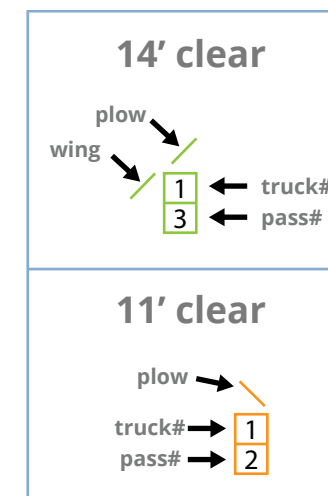
Turns and proceed back through the intersection. Begin **Pass 1/5** entering the far U-turn staying to the right using only the front-plow angled left. Complete the turn, merge onto the left-through lane of the opposite direction. Proceed through the intersection then enter the other U-turn ramp on **Pass 1/5** staying to the right, plow angled left. Complete the turn and merge into the left- through lane.



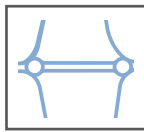
Proceed through the intersection and enter the far U-turn ramp to begin **Pass 1/6**. Stay to the left using front plow angled left only. Complete the turn and merge into the left-through lane of the opposite direction. Cross the intersection and enter the near U-turn ramp, continuing **Pass 1/6 staying** left and merge into the left-through lane.



**Truck #2 Minor road - Begin Pass 2/1** at the near end-point of the minor road. Proceed in one direction with the front plow angled to the right and the right wing extended. Cross the intersection when traffic clears and continues to the far end-point. Turn around and begin **Pass 2/2** in the opposite direction. Cross the intersection when traffic clears and resumes **Pass 2/2** to completion.







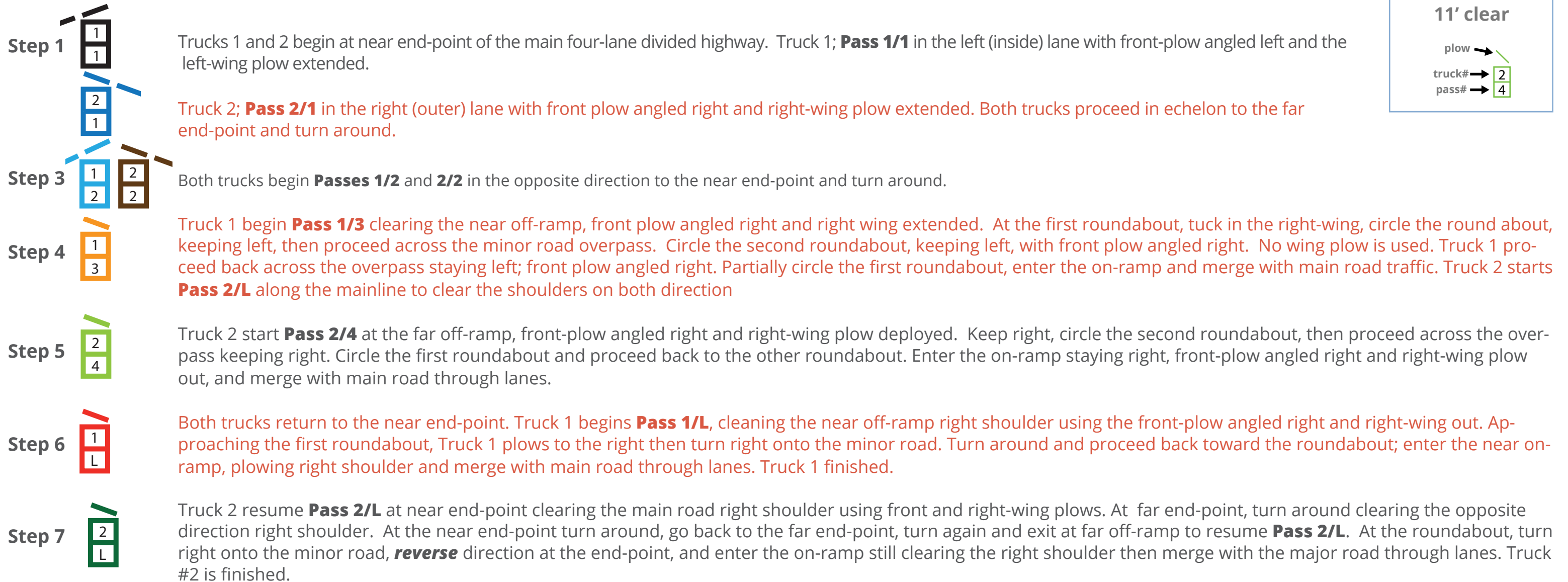
# Double Roundabout Interchange



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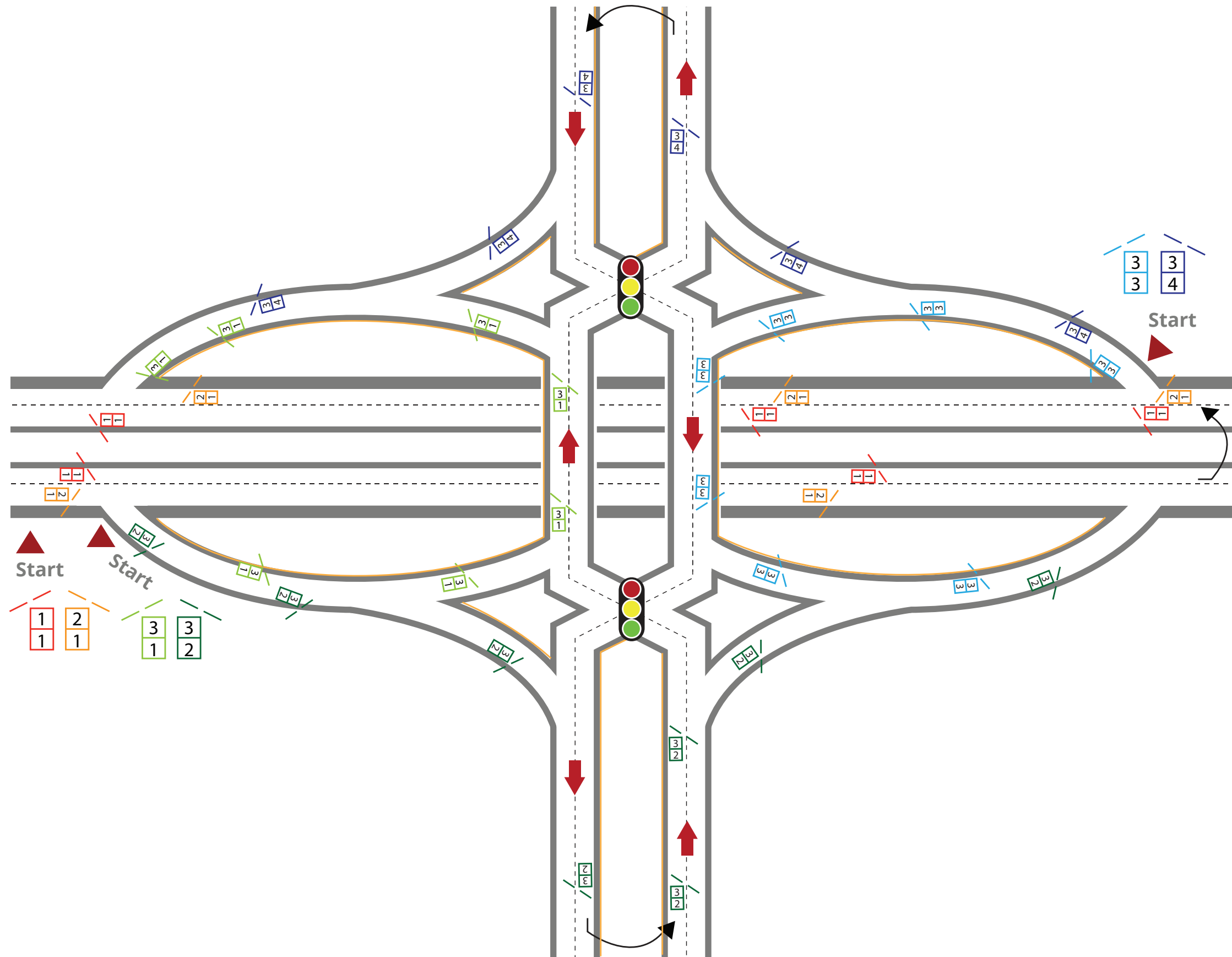
**Instructions for Use:** In order to distinctly show multiple passes and trucks in the diagram, individual truck numbers, pass numbers, and plow configurations were depicted on the right. A typical clear width is 11' for a front plow only and 14' for a front plow and a wing plow. The starting point of a pass is indicated by ◀ and a U-turn is depicted by ↻ in the diagram.

**General Notes:** Two trucks clear the main road first, then the ramps and minor road with the roundabouts.

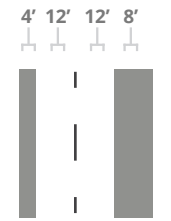




# Diverging Diamond Interchange 1/2



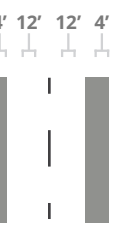
### Freeway



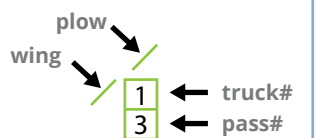
### Ramp



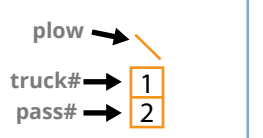
### Road



### 14' clear



### 11' clear







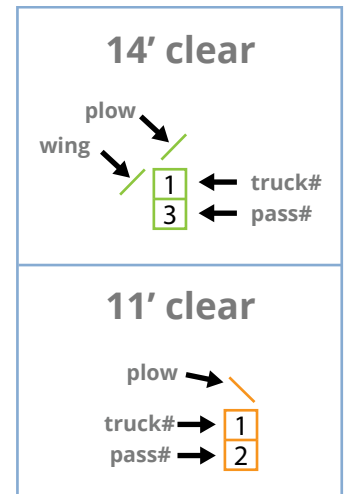
# Diverging Diamond Interchange 1/2



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**Instructions for Use:** In order to distinctly show multiple passes and trucks in the diagram, individual truck numbers, pass numbers, and plow configurations were depicted on the right. A typical clear width is 11' for a front plow only and 14' for a front plow and a wing plow. The starting point of a pass is indicated by ◀ and a U-turn is depicted by ↻ in the diagram.

**General Notes:** A diverging-diamond interchange is like a standard diamond interchange except the through and turn lanes are reversed on the overpass. This eliminates the need for exclusive left-turn traffic signal phases. This uses three trucks, each with a front-reversible and a right-wing plow. Two trucks handle the freeway and the third truck the local road. Both roadways are four-lane divided; the through lanes are 12'-wide; the ramp lanes are sixteen-feet wide. The freeway shoulders and ramps are four-foot left and eight-foot right; all shoulders are four-foot wide. Note that when plowing on the overpass, trucks should reduce speed to prevent projecting snow over the railings to the road below.



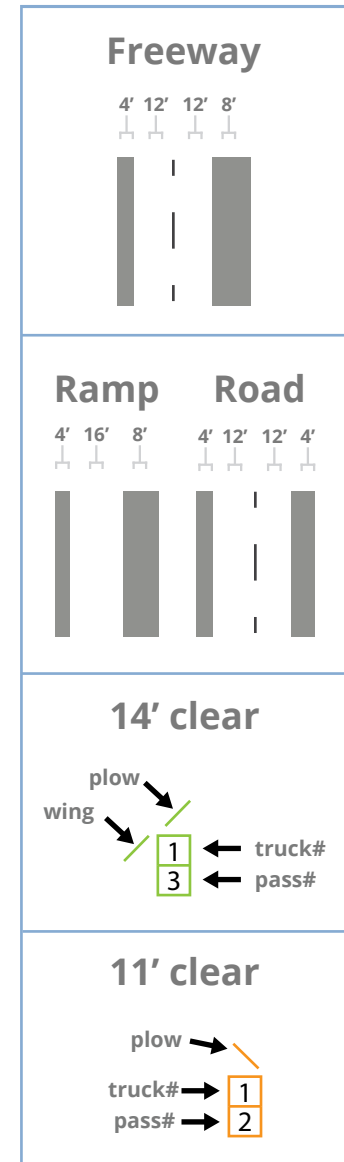
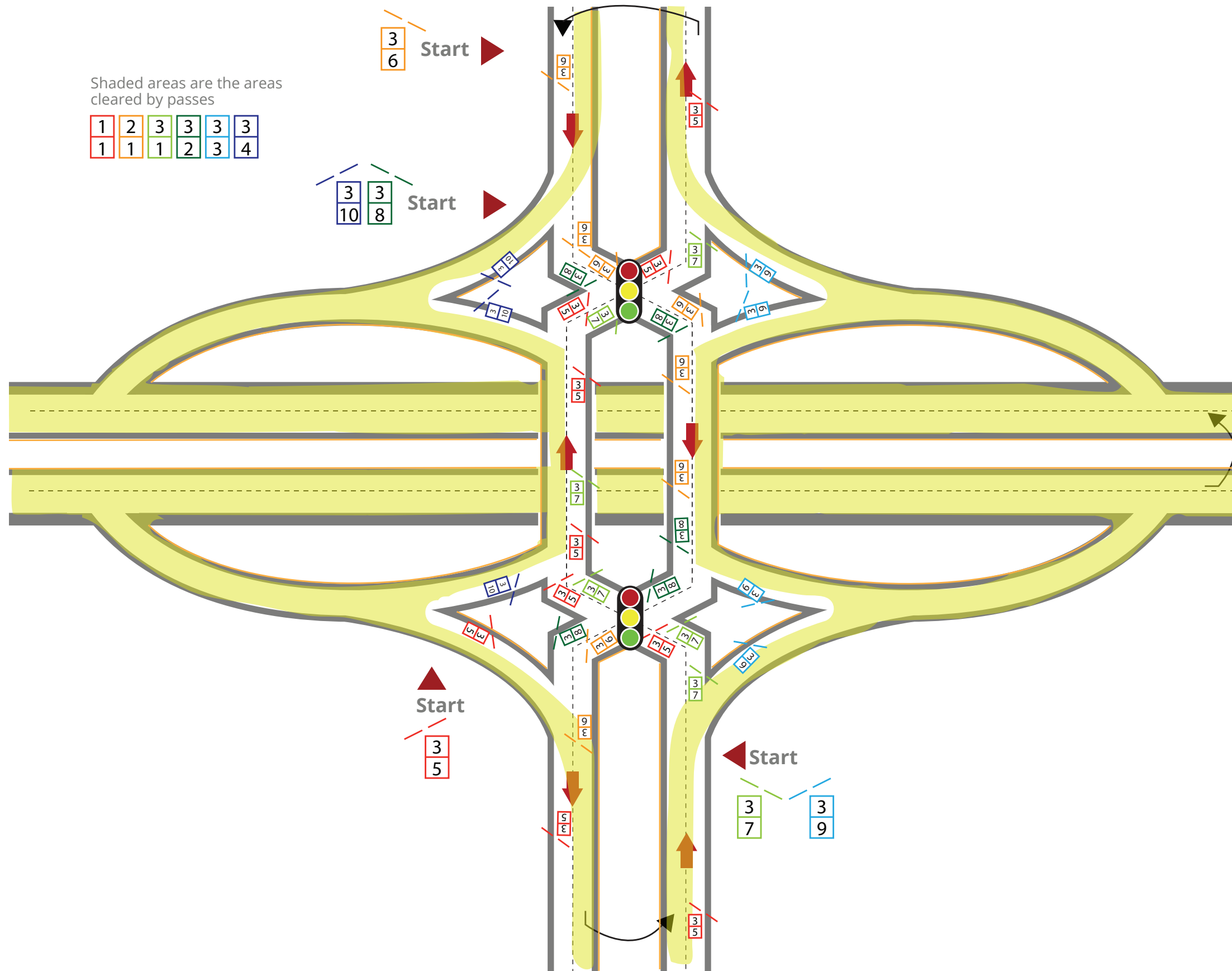
- Freeway Step 1** **Trucks 1 and 2** are freeway trucks and both start at the near end-point in echelon (truck 2 slightly trailing truck 1). Truck 1 begin **Pass 1/1** in the left-through, lane, front-plow angled left and left wing extended. Truck 2 begin **Pass 2/1** in the right-through lane; front-plow angled right and right-wing plow extended onto the shoulder both trucks continue to the far end-point, turn around, and continue **Passes 1/1** and **1/2** in the opposite direction back to the near end-point.
- Ramp Step 1** **Truck 3** is ramp truck and start at the near end-point of the freeway, proceeds to the off-ramp to begin **Pass 3/1**. Stay to the left with front-plow angled left and left wing extended. Where the ramp splits, continue to the left. At the end of the ramp, turn left onto the local road left-through lane, **reverse** the front-plow to angle right and extend the right-wing. Continues across the overpass and enter the on-ramp. **Reverse** the front-plow to angle left, extend the left wing and stay to the left on the ramp. Merge with freeway through lanes and proceed to end-point.
- Ramp Step 2** Turn around and proceed to the off-ramp to begin **Pass 3/2**. Stay to the right with front-plow angled right and right-wing plow extended. At the split, stay right and then merge with the left lane. The front-plow stays angled right and the right-wing plow out. Proceed to the end-point, turn around and continue **Pass 3/2** in the left-through lane. Nearing the overpass, move to the right and enter the on-ramp. Stay right on the ramp, merge onto the freeway and proceed to the far end-point.
- Ramp Step 3** Turn around and proceed to the off-ramp to begin **Pass 3/3**. The front-plow is angled left and left wing is extended. Stay left past the split. At the end of the ramp, turn onto the left-through lane. Keeping the front-plow angled left, cross the overpass and enter the on-ramp. Continue along the left of the ramp, merge onto the freeway through lanes and proceed to the end-point.
- Ramp Step 4** Turn around and proceed to the off-ramp to begin **Pass 3/4**. The front-plow is angled right and the right-wing plow extended as the truck stays to the right along the ramp. At the split, stay right. At the end of the ramp merge onto the left-through lane. Proceed to the end-point, turn around and resume **Pass 3/4** in the left-through lane. Approaching the overpass, shift right and enter the on-ramp. Stay to the right, merge onto the freeway through lanes and proceed to the end-point.

= **Reverse** Plow





# Diverging Diamond Interchange 2/2





# Diverging Diamond Interchange 2/2



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Turn around and exit onto the freeway off-ramp. Approaching the right side of the divider island, **reverse** front-plow to the left, extend left wing, and begins **Pass 3/5** along the island's left shoulder. At the end of the ramp, **reverse** the front-plow to the right, extends the right-wing plow and merge with the right-through lane of the local road. Plow this lane and shoulder to the end-point. Turn around and resume **Pass 3/5** in the opposite direction right-through lane. Shift into the left-through lane at the near-side traffic signal. Proceed on the signal across the intersection and shift into the right-through lane. At the traffic signal at the other end of the overpass, shift to the left-through lane. Proceed on the signal across the intersection and then shift to the right-through lane. Continue **Pass 3/5** to the end-point.



Turn around and begin **Pass 3/6** in the right-through lane. Approaching the near side traffic signal, shift to the left-through lane then **reverse** the front-plow to left-angle and extend left wing. Proceed on the signal across the intersection the shift to the right-through lane, **reverse** the front-plow to the right and extend right wing. Approaching the far side traffic signal, shift to the left-through lane. Proceed on the signal across the intersection, stay in the left-through lane and continue **Pass 3/6** to the end-point.



Turn around and begin **Pass 3/7** in the right-through lane, front plow to the right and right-wing extended. Cross the near intersection on the signal and continue in the right-through lane of the overpass. Proceed through the far intersection on the signal and continue in the right-through lane to the end-point.



Turn around and begin **Pass 3/8** in the right-through lane of the opposite direction. Cross both intersections at the overpass on the signal, stay in the right-through lane to the end-point.



- Turn around and begin Pass **3/9** entering the first on-ramp. Clear the right side of the island, front-plow angled left, left wing extended. Proceed down the on-ramp, merge with freeway and proceed to the end-point.
- Turn around and exit onto the off-ramp of the opposite direction. At the split stay right, **reverse** the front plow to the right and clear along the island. Merge onto the local road left-through lane.
- Enter the next on-ramp. Angle the front-plow right and extend right wing and clear along the island. Merge onto freeway and proceed to end-point.
- Turn around and again exit onto the off-ramp. At the split stay left, **reverse** front-plow to left, extend left wing and clear along the island. Merge with local road through lanes and proceed to the end-point.



- Turn around and enter the next on-ramp. Stay to the left, front-plow angled left, left wing extended, and clear along the island. Proceed down the ramp, merge onto freeway to the end-point.
- Turn around and then exit onto the off-ramp. At the split, stay right, **reverse** the front plow to the right, extend right wing, and clear along the island. At the end of the ramp turn left onto the local road through lanes.
- Cross the overpass then enter the on-ramp, stay right, front plow angled right, right wing extended clearing the remaining side of the island. Continue down the ramp and merge with the freeway. This completes all passes.

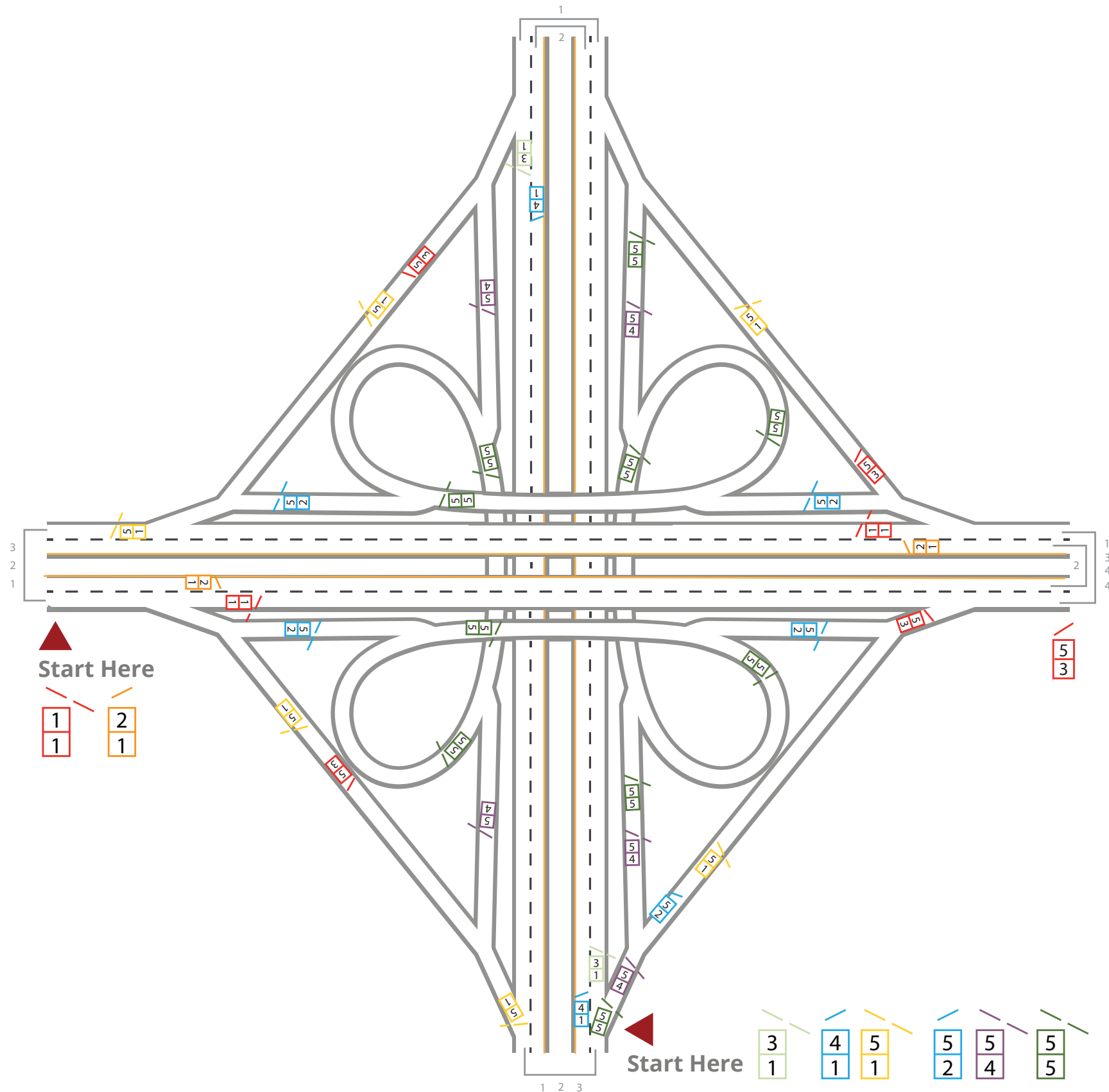
 = **Reverse** Plow



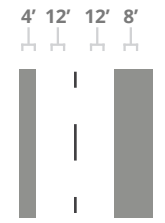
# Cloverleaf Interchange with C/D Lanes



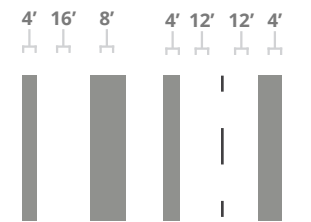
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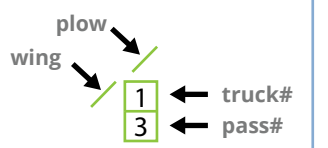
### Freeway



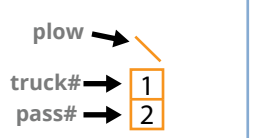
### Ramp Road



### 14' clear



### 11' clear





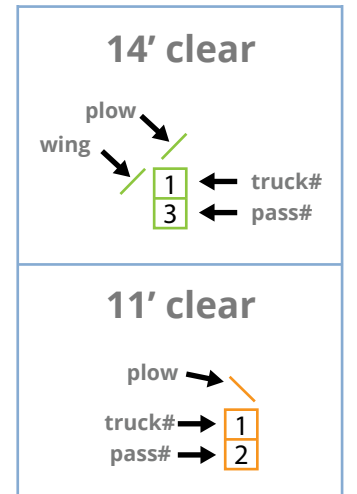
# Cloverleaf Interchange with C/D Lanes 1/2



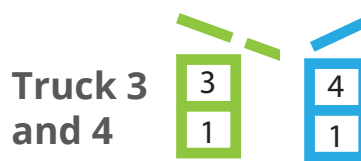
research for winter highway maintenance

**Instructions for Use:** In order to distinctly show multiple passes and trucks in the diagram, individual truck numbers, pass numbers, and plow configurations were depicted on the right. A typical clear width is 11' for a front plow only and 14' for a front plow and a wing plow. The starting point of a pass is indicated by ◀ and a U-turn is depicted by ↻ in the diagram.

**General Notes:** In the best practice example, a full cloverleaf interchange with C/D lanes has been considered. Five trucks are employed in the example: trucks 1 and 2 for the four-lane divided main highway, trucks 3 and 4 for the four-lane lower cross road, and truck 5 for the loop and outer ramps as well as C/D connector lanes. Trucks 1, 3, and 5 have a front plow and a right-wing plow, while trucks 2 and 4 only have a front plow. The through lanes are 12' wide on both the highway and the cross road with 4' wide left shoulders and 8' wide right shoulders. The lanes on the ramps are 16' wide with 4' wide left shoulders and 8' wide right shoulders. **Note that the main road overpass lanes are separated by an open space; each time the truck plows across the overpass it must slow down and "square the plow" to avoid casting snow off the overpass to the roadway below.**



**Truck 1 and 2 : Step 1:** Trucks 1 and 2 start from the main road near end-point. Truck 1 begins **Pass 1/1** in the right-through lane with front-plow angled right and right wing extended. Truck 2 begins Pass 2/1 in the left through lane with only front plow angled left, slightly behind Truck 1. They proceed across the overpass, carefully to not propel plowed snow over the railing. The trucks continue across the overpass to the far end-point. They turn around, resume **Passes 1/1** and **2/1**, keep in formation. The truck proceed across the overpass in the opposite direction to the near end-point.



**Truck 3 and 4: Step 1:** Trucks 3 and 4 start at the near end-point of the lower cross road. Truck 3 begins Pass 3/1 in the right- through lane of the lower road, front -plow angled right and right-wing plow extended. Truck 4 begins Pass 4/1 in the left-through lane, front-plow only angled left, slightly behind Truck 3. They proceed to the far end-point and turn around. The trucks resume Passes 3/1 and 4/1 in the opposite direction to the near end-point.

**Note that when plowing the right shoulders, the truck should square the plow to carry snow across the merge of the on-ramps with the through lane and the entrance to the off-ramps.**



**Truck 5 Step 1:** Truck 5 begins Pass 5/1 on the outer-ramp at the near end-point of the lower cross road. It proceeds along the right shoulder with front-plow angled right and right-wing extended. It merges with main road through lanes and proceeds to end-point. The truck turns around, shifts right, exits onto the out-er-ramp. It resumes pass 5/1 along the right shoulder, with front-plow angled right and right-wing plow out. It merges with lower cross road through lanes and proceeds to end-point. Truck 5 turns around, repeats the same steps to clear all the outer ramps and proceeds back to the near end-point of the lower cross road.



**Step 2: Truck 5 begins Pass 5/2** on the out-ramp at the near end-point of the lower cross road. It proceeds along the left shoulder with only front plow angled left. It merges with main road through lanes and proceeds to end-point. The truck turns around, exits onto the main road C-D ramp and continues pass 5/2 on the connector, with front-plow angled right and right-wing extended. It continues across the overpass, merges with through lanes and proceeds to main road near end-point. The truck turns around, shifts right and exits onto the C-D ramp of the opposite direction. It resumes Pass 5/2 with front-plow angled right and right wing extended. The truck continues across the overpass and merges with main road through lanes. It proceeds to main road far end-point.

**Note that as the truck approaches the merges with the "loop" ramps it aligns plows to carry the snow across the openings.**



# Cloverleaf Interchange with C/D Lanes 2/2



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**Step 3:** Truck 5 turns around and begins **pass 5/3** by repeating the same pattern as **Pass 5/1** plowing the remaining outer ramps in the same sequence but now along the left shoulder, with only front-plow angled left. **Pass 5/3** completes when the truck arrives at lower road near end-point.

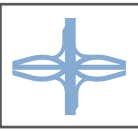


**Step 4:** The truck turns around, exits onto the lower cross road C-D ramp and starts **Pass 5/4** on the connector, with front-plow angled right and right-wing extended. It merges with through lanes and proceeds to lower cross road far end-point. The truck turns around, shifts right and exits onto the C-D ramp of the opposite direction. It resumes Pass 5/4 with front-plow angled right and right wing extended. The truck merges with main road through lanes and proceeds to lower cross road near end-point.

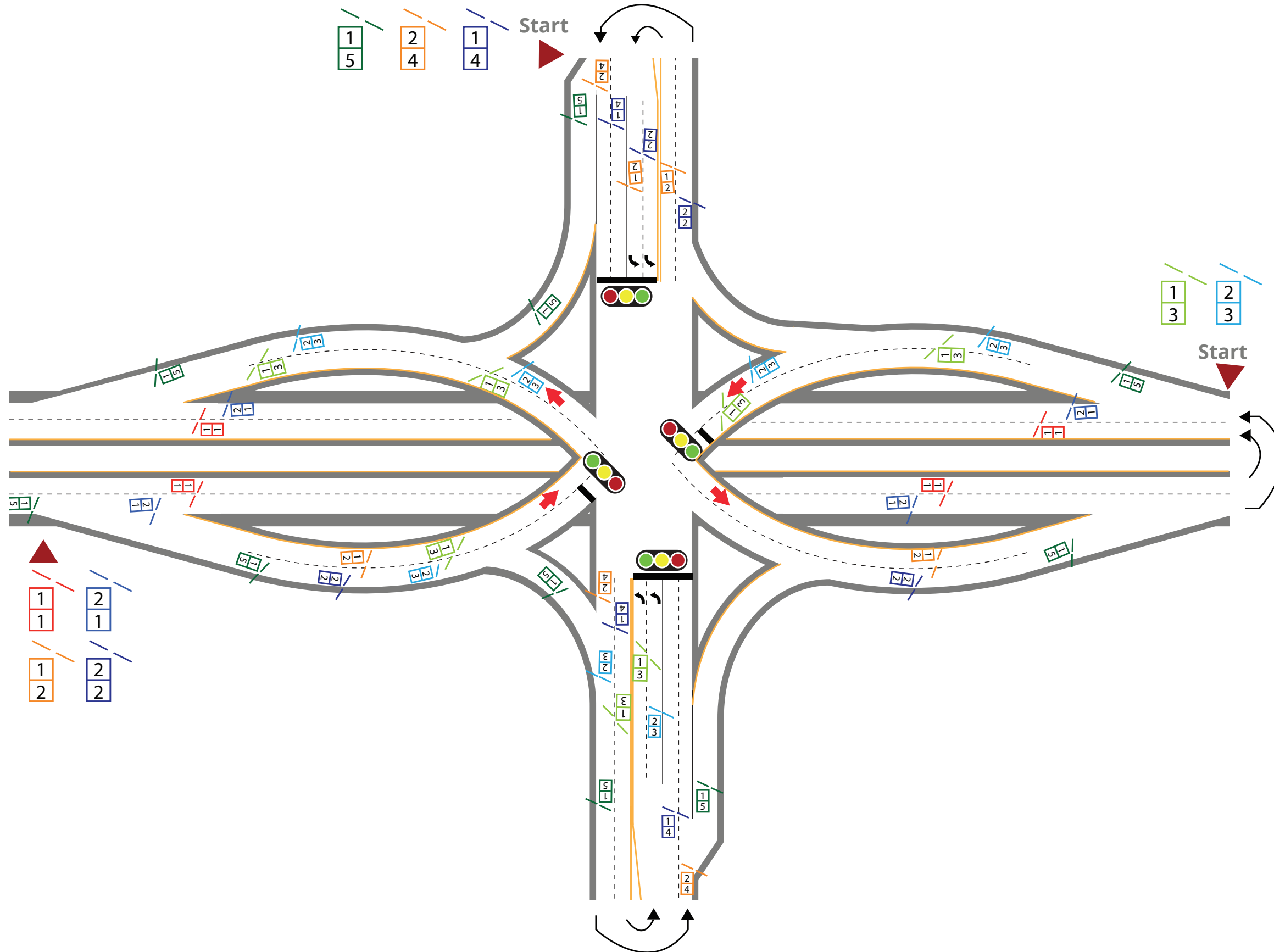


**Step 5: Truck 5** turns around, shifts right, exits onto the lower road C-D connector. It proceeds under the overpass and begins **pass 5/5** at the loop-ramp. It proceeds with front-plow angled right and right plow extended. The truck merges onto the main road C-D connector, proceeds across the overpass and enters opposite side loop-ramp. It merges onto the lower C-D connector, proceeds under the overpass then enters the loop-ramp. It then merges onto the main road C-D connector and proceeds across the overpass. The truck enters the loop-ramp and merges onto the lower road C-D connector, proceeds under the overpass to the far end of the lower cross road. This completes all passes.

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# Single Point Interchange



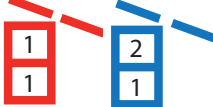




<b>Road</b>							
4'	12'	12'	12'	12'	12'	12'	4'
[Diagram showing plow path and truck passes for a road with 6 lanes]							
<b>Freeway</b>							
4'	12'	12'	8'				
[Diagram showing plow path and truck passes for a freeway with 4 lanes]							
<b>Ramp</b>	<b>Road</b>						
4'	16'	8'	4'	12'	12'	4'	
[Diagram showing plow path and truck passes for a ramp and road configuration]							
<b>14' clear</b>							
plow	wing	truck#	pass#				
[Diagram showing 14-foot clearance for a truck with a plow wing]							
<b>11' clear</b>							
plow	truck#	pass#					
[Diagram showing 11-foot clearance for a truck with a plow]							





**Instructions for Use:** In order to distinctly show multiple passes and trucks in the diagram, individual truck numbers, pass numbers, and plow configurations were depicted on the left. The starting point of a pass is indicated by ◀ and a U-turn is depicted by ↷ in the diagram.

**General Notes:** Two trucks; each has a front and right-wing plow capable of a clearing a 14' span. The plows of both trucks are angled to push snow to the right.

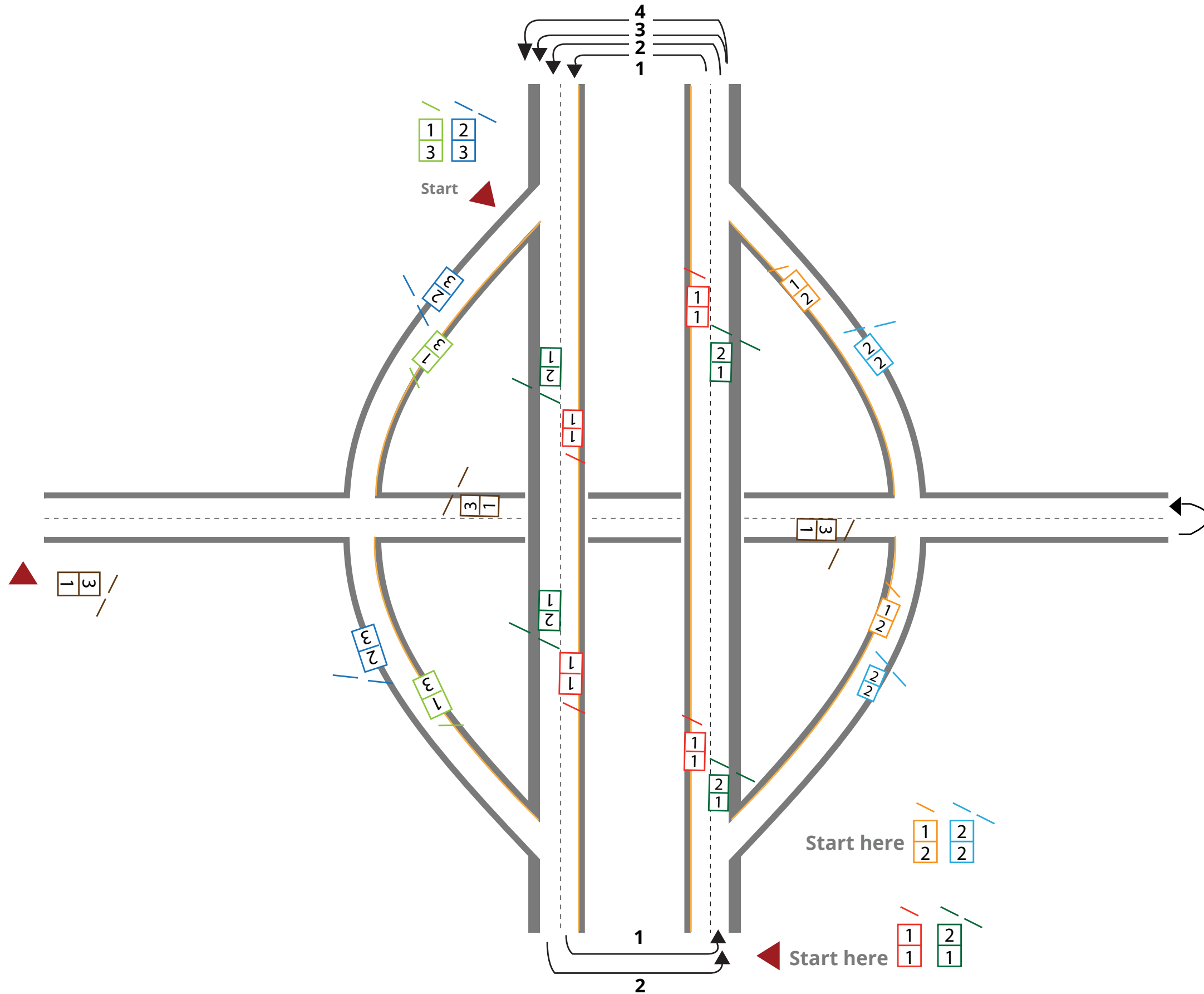
- Step 1**  **Truck 1** begins **Pass 1/1** in the left lane or inside lane of the four-lane divided main road; truck 2 begins Pass 2/1 in the right lane or outside lane, slightly behind and to the right of truck 1. At the far end-point, both trucks turn around and continue Passes 1/ 1 and 2/ 1 in the opposite direction.
- Step 2**  Both trucks turn around at the near end-point and begin **Passes 1/2** and **2/2** on the near off-ramp. They turn left at the intersection and continue plowing both through lanes of the minor road. At the next end-point, both trucks turn around and clear the two left-turn lanes. They proceed across the intersection, plow the on-ramps then merge onto the major road.
- Step 3**  Both trucks turn around at the far end-point of the major road, then begin **Passes 1/3** and **2/3** on the off-ramp. They turn left at the intersection and continue plowing both through lanes of the minor road. They turn around at the minor road end-point and continue **Passes 1/3** and **2/3** in the opposite direction left turn lanes. They proceed across the overpass on the green signal and turn left in formation and enter the on-ramp. Merging onto the highway, they continue to the far end point of the highway. Both trucks turn around, then they shift right to the off ramp. Staying in formation, they proceed up the off ramp to the traffic signal at intersection, with wing plow tucked in and front plow lifted (since on-ramp is already cleared). On the green signal, they turn left and continue on the two through lanes to the far end point of the minor road.
- Step 4**  The trucks turn around and begin **PASSES 1/4** and **2/4** with front plow lowed and wing plow extended. They plow the two through lanes, proceed across the overpass on the green signal, and continue to reach the near end point of the minor road. The trucks turn around and continue **PASSES 1/4** and **2/4** in the two through lanes. They proceed across the overpass on the green signal and continue to reach far end point of the minor road.
- Step 5**  **Truck 2** is dismissed. **Truck 1** turns around at the minor road end-point. It begins pass **1/5** enters the on-ramp right lane, then merges onto the main road. It turns around at the end-point and enters the right lane of the off-ramp. It proceeds up the ramp merging with the minor road through lane.

When it reaches the end-point, it turns around, shifts to the far-right lane, enters the on-ramp and plows the lane and shoulder until merging onto the main road. It turns around at the end point and enters the off-ramp. The truck proceeds to turn right onto the minor road right lane. This completes all passes.





# Diamond Interchange



**Freeway**  
4' 12' 12' 8'

**Ramp Road**  
4' 16' 8' 4' 12' 12' 4'






**14' clear**  
truck# → 2  
pass# → 2

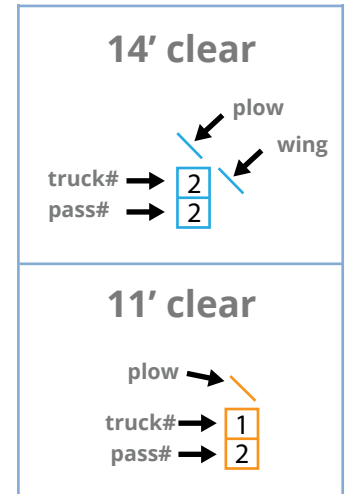
**11' clear**  
plow →  
truck# → 1  
pass# → 2



**Instructions for Use:** In order to distinctly show multiple passes and trucks in the diagram, individual truck numbers, pass numbers, and plow configurations were depicted on the right. A typical clear width is 11' for a front plow only and 14' for a front plow and a wing plow. The starting point of a pass is indicated by ◀ and a U-turn is depicted by ↻ in the diagram.

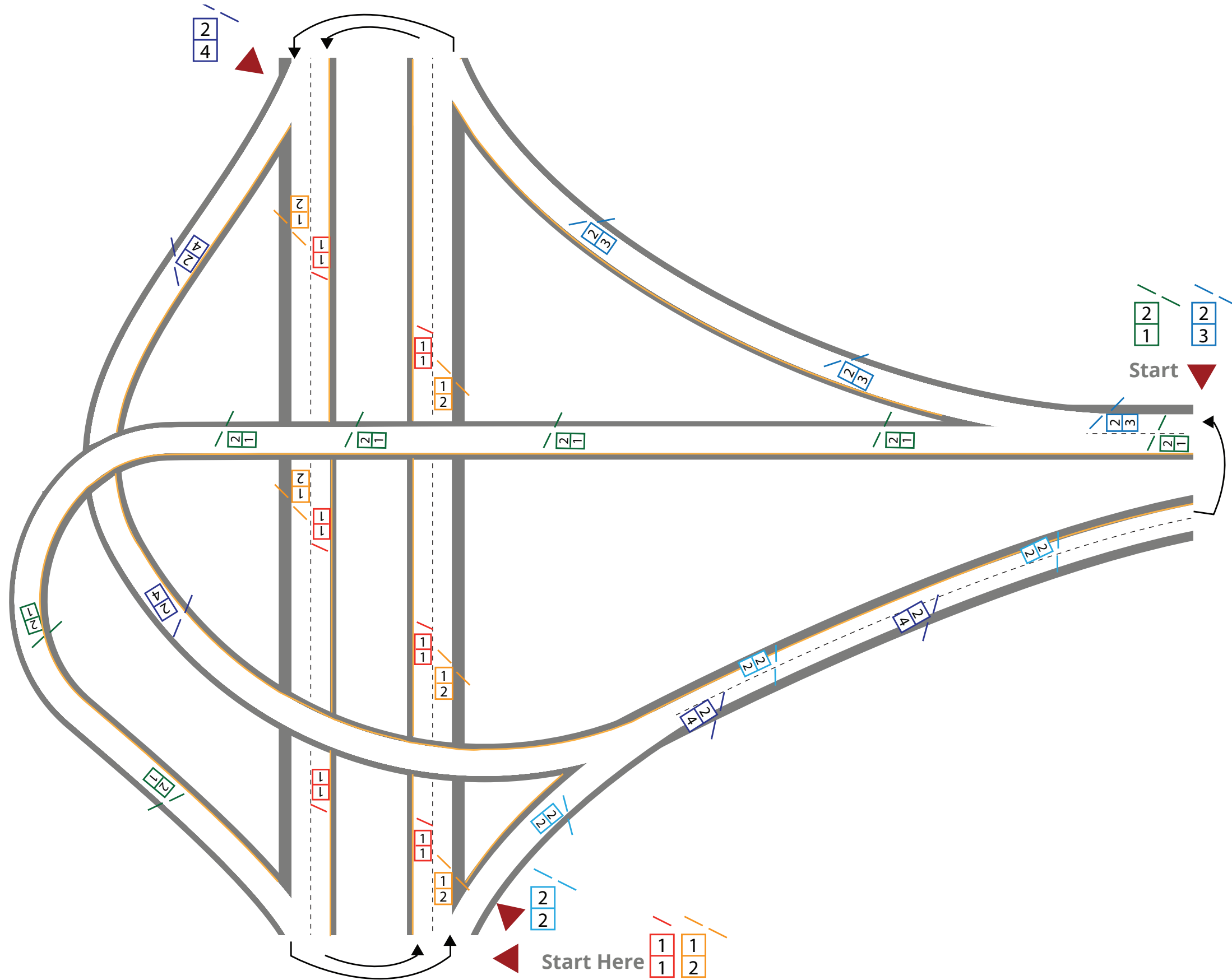
### General Notes:

- Trucks 1 and 2 Step 1**
- 
- **Truck #1 and Truck #2** - clear the main lane first then clear the ramps. Truck #3 clears the cross route.
  - **Truck #1 and Truck #2:** Begin in one direction on the main four-lane, divided highway, pushing snow to right:
  - **Truck 1/1** clears inside lane;
  - **Truck 2/1** trailing slightly behind truck 1, clears outside lane.
- Step 2**
- 
- At turn-around point both trucks cross-over and continue in opposite direction pushing snow to the right:
  - **Truck 1/1** clears inside lane;
  - **Truck 2/1** trailing slightly behind truck 1, clears outside lane.
- Step 3**
- 
- At turn-around point, both trucks cross-over to clear exit-entrance ramps on one side of highway, pushing snow to right:
  - **Truck 1/2** stays to inside (left);
  - **Truck 2/2** stays to outside (right).
  - With elevated ramps push snow to low side of road.
- Step 4**
- 
- At turn-around point, both trucks cross-over to exit-entrance ramps on opposite side of highway, pushing snow to right:
  - **Truck 1/3** stays to inside (left);
  - **Truck 2/3** trailing slightly behind truck 1, stays to outside (right).
- Truck 3 Steps**
- 
- **Truck #3** - Begins clearing in one direction on two-lane cross road, pushing snow to the right;
  - At turn-around point Truck 3 begins clearing in opposite direction, pushing snow to the right.





# Directional T Interchange



**Freeway**  
4' 12' 12' 8'

**Ramp**  
4' 16' 8'

**14' clear**  
plow wing  
truck# 1  
pass# 3

**11' clear**  
plow  
truck# 1  
pass# 2



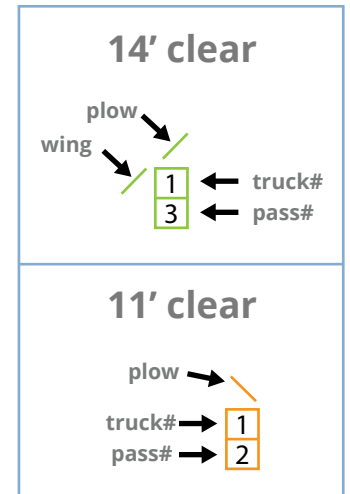
# Directional T Interchange






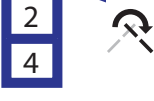


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**Instructions for Use:** In order to distinctly show multiple passes and trucks in the diagram, individual truck numbers, pass numbers, and plow configurations were depicted on the right. A typical clear width is 11' for a front plow only and 14' for a front plow and a wing plow. The starting point of a pass is indicated by ◀ and a U-turn is depicted by ↻ in the diagram.

**General Notes:** Two trucks are used, one has a front plow and a right wing plow, the other has a front plow and dual wing plow.



- Truck 1 Step 1**  **Truck #1** - Begins **Pass 1/1** in the left (inside) through lane in one direction of the major road. It uses front-plow only angled to the right. At the far end-point it turns around and continues **Pass 1/1** in left-through lane of the opposite direction.
- Step 2**  It turns around at the near end-point onto the right- through lane and begins **Pass 1/2** with the right-wing plow fully extended. At the far end-point it turns and continues **Pass 1/2** in the right lane to the end-point.
- Truck2 Step 1**  **Truck #2** - Truck 2 begins **Pass 2/1** at near end-point of minor road. The right-wing plow is fully extended and the front plow angled to the right. It proceeds across the overpass; as it enters the banked curve of the ramp it **reverses** the angle of the front plow to the left and extends the left-wing plow. As the curve straightens. it re-angles the front plow to the right and extends the right-wing plow out. It merges onto the major road and turns around at the designated point.
- Step 2**  Truck 2 enters the near off-ramp and begins **Pass 2/2** with front plow angled right and right-wing plows extended. At the merge with another ramp it shifts to the left lane, retracts the right-wing plow and continues with the front plow only **angled right**. When the ramp ends, the truck continues to the minor road end-point and turns around.
- Step 3**  Truck 2 heads back toward the overpass in the right lane, both plows angled to the right. And enters the on-ramp to begin Pass 2/3. It proceeds down the ramp, merges onto the major road and continues to the far end-point. It turns around and exits onto the off-ramp.
- Step 4**  It starts **Pass 2/4** with both plows angled to the right but at the beginning of the banked curve, the front plow is angled left and the left wing is extended. As the curve straightens the truck **reverses** the front plow angle to the right. Where the overpass merges with the other ramp, truck 2 shifts to the right (outside) lane and continues to the end-point.

The Directional T interchange is now complete except for additional cleanup along some shoulders and at gore areas.

 = **Reverse** Plow