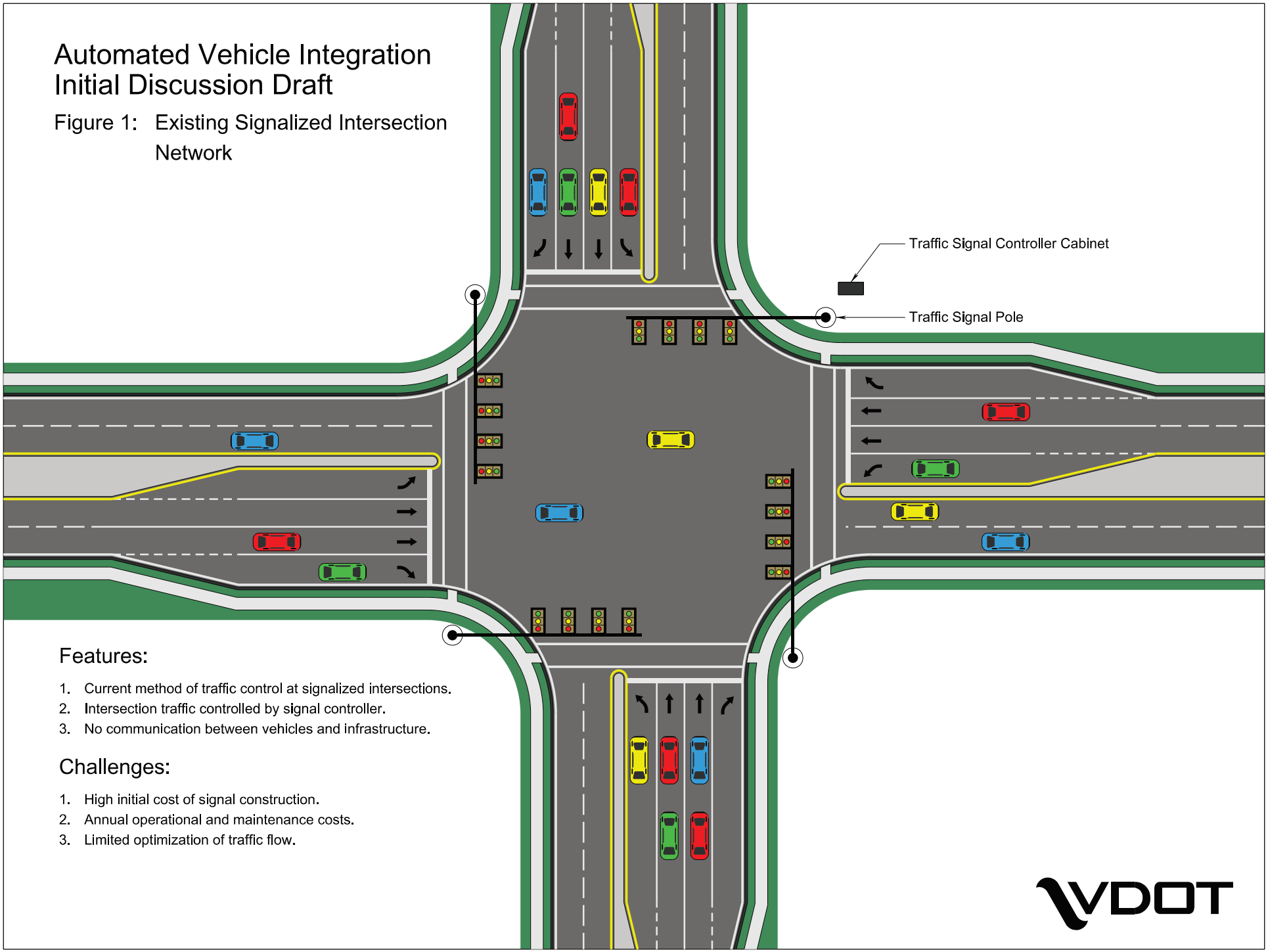
Automated Vehicle Integration
Initial Discussion Draft

Figure 1: Existing Signalized Intersection Network



Features:

1. Current method of traffic control at signalized intersections.
2. Intersection traffic controlled by signal controller.
3. No communication between vehicles and infrastructure.

Challenges:

1. High initial cost of signal construction.
2. Annual operational and maintenance costs.
3. Limited optimization of traffic flow.

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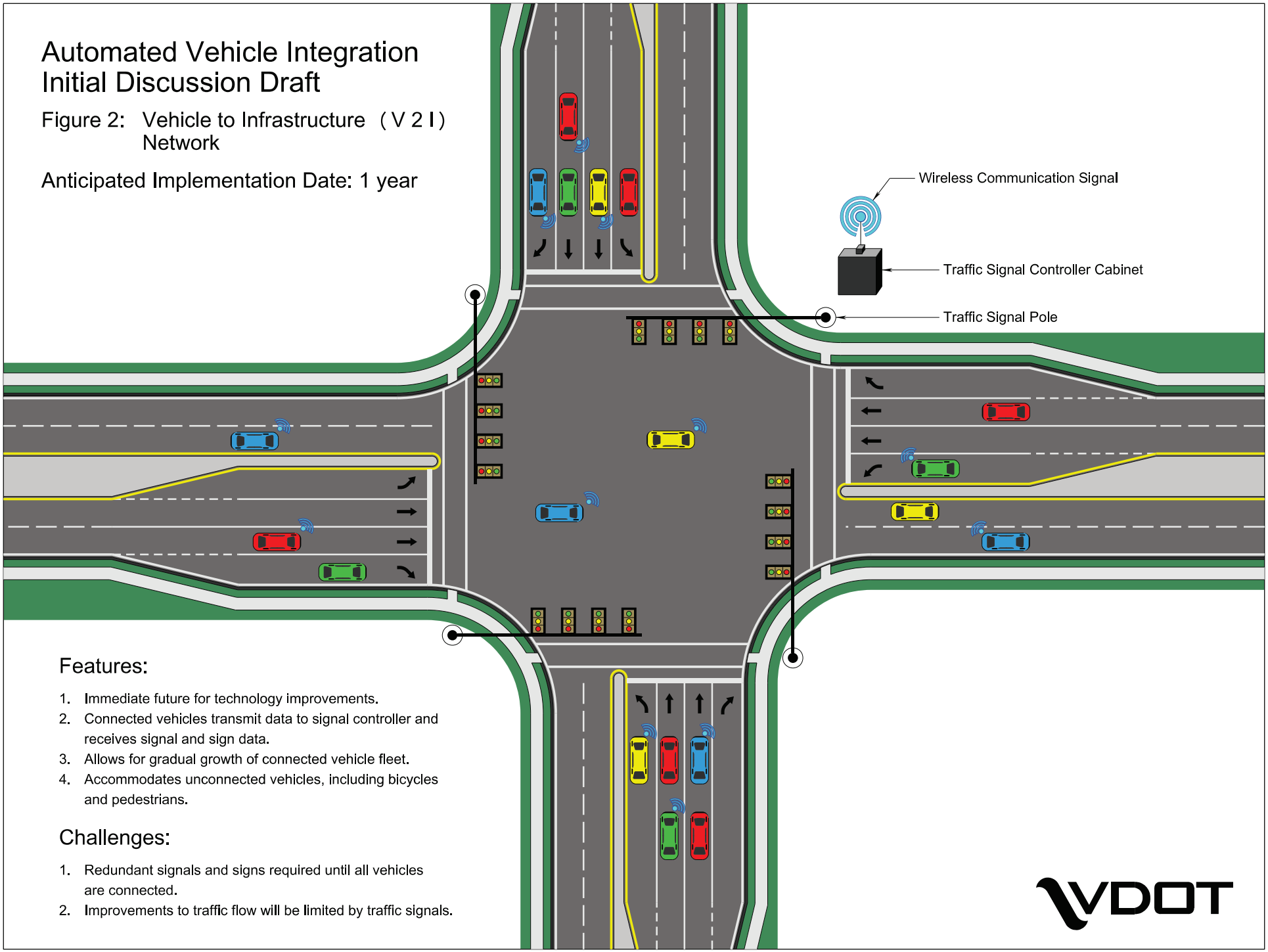
Automated Vehicle Integration
Initial Discussion Draft

Figure 2: Vehicle to Infrastructure (V2I) Network

Anticipated Implementation Date: 1 year



Features:

1. Immediate future for technology improvements.
2. Connected vehicles transmit data to signal controller and receives signal and sign data.
3. Allows for gradual growth of connected vehicle fleet.
4. Accommodates unconnected vehicles, including bicycles and pedestrians.

Challenges:

1. Redundant signals and signs required until all vehicles are connected.
2. Improvements to traffic flow will be limited by traffic signals.

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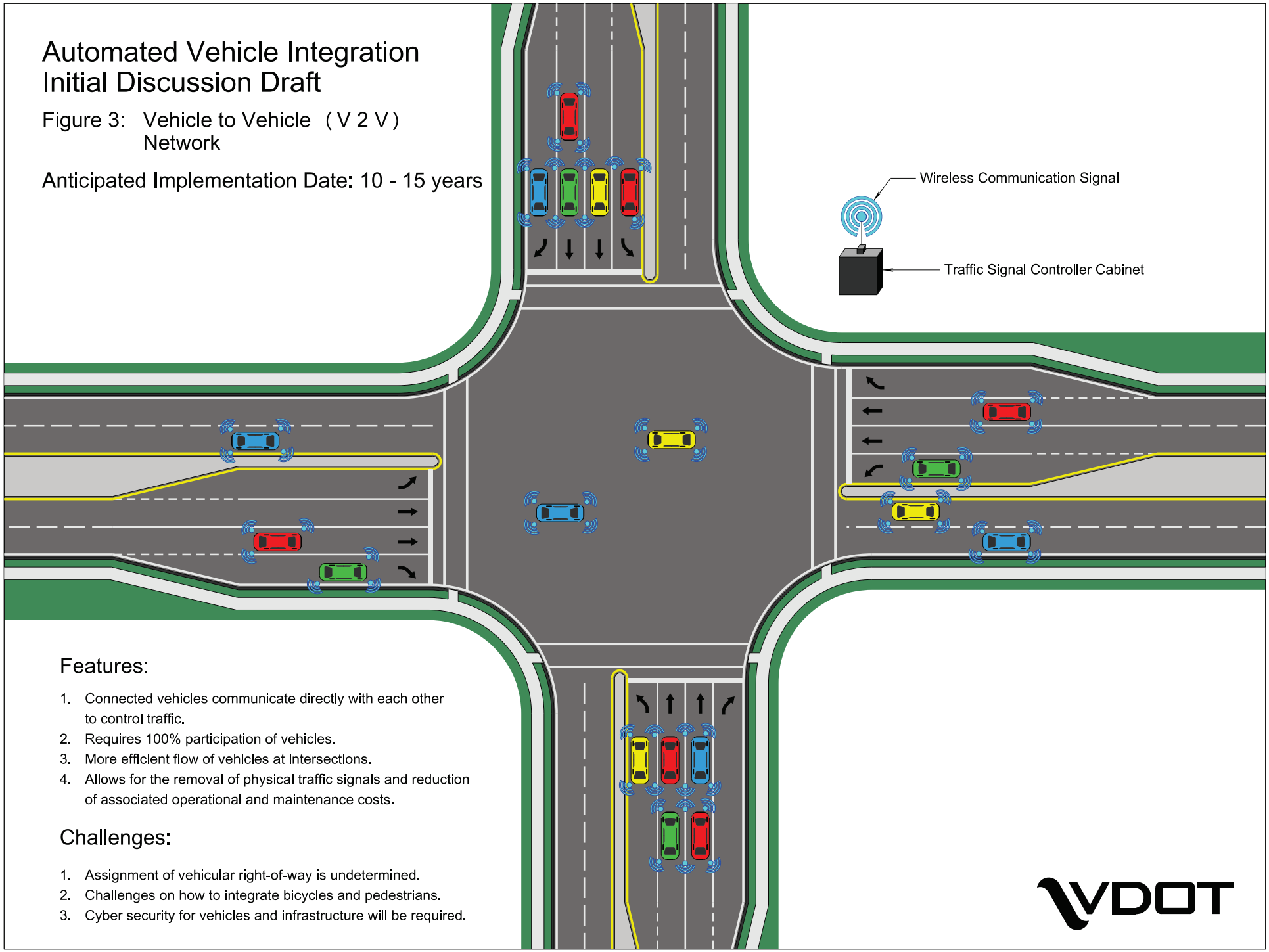
Automated Vehicle Integration
Initial Discussion Draft

Figure 3: Vehicle to Vehicle (V 2 V) Network

Anticipated Implementation Date: 10 - 15 years



Features:

1. Connected vehicles communicate directly with each other to control traffic.
2. Requires 100% participation of vehicles.
3. More efficient flow of vehicles at intersections.
4. Allows for the removal of physical traffic signals and reduction of associated operational and maintenance costs.

Challenges:

1. Assignment of vehicular right-of-way is undetermined.
2. Challenges on how to integrate bicycles and pedestrians.
3. Cyber security for vehicles and infrastructure will be required.

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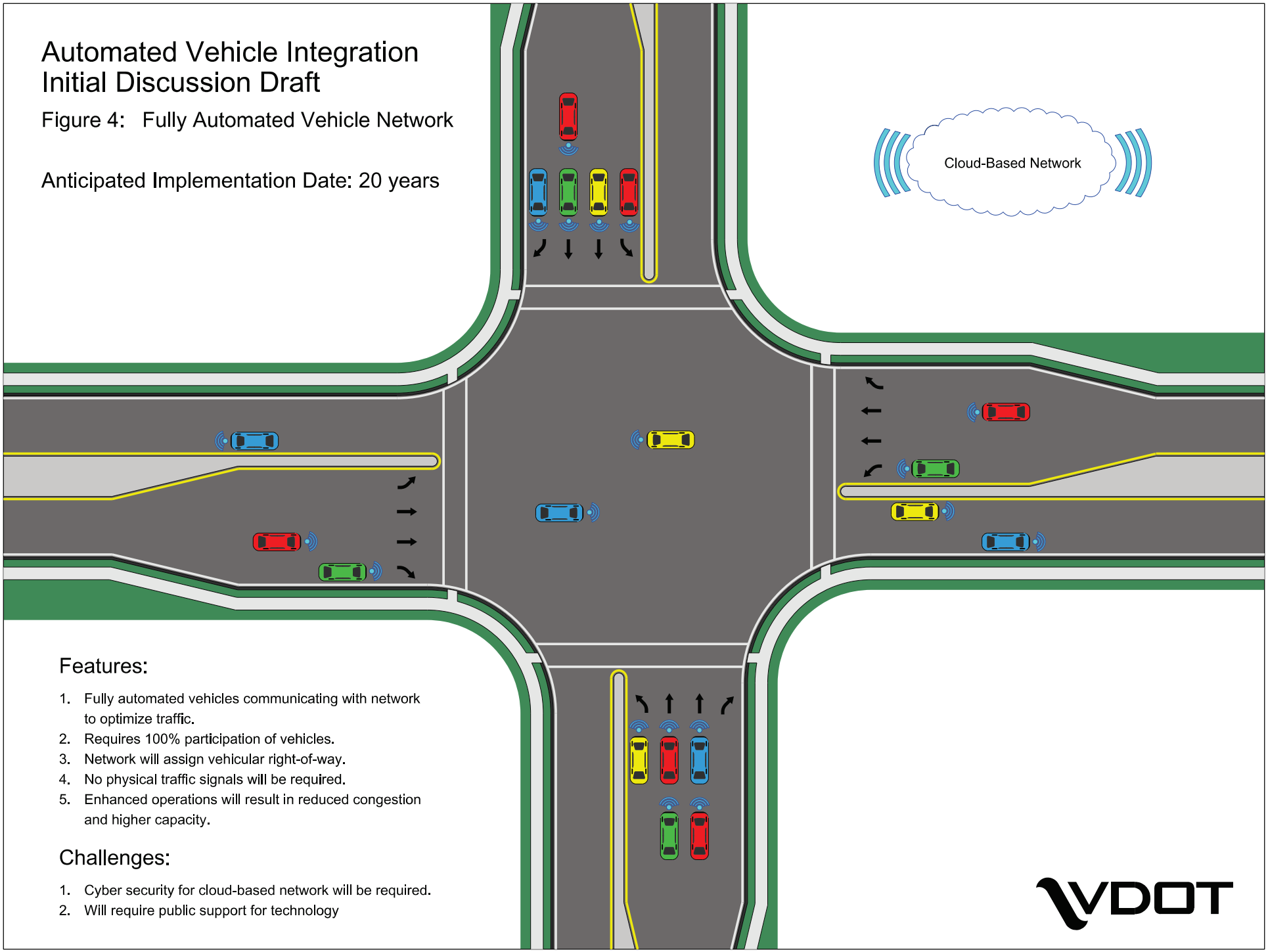
Automated Vehicle Integration
Initial Discussion Draft

Figure 4: Fully Automated Vehicle Network

Anticipated Implementation Date: 20 years



Features:

1. Fully automated vehicles communicating with network to optimize traffic.
2. Requires 100% participation of vehicles.
3. Network will assign vehicular right-of-way.
4. No physical traffic signals will be required.
5. Enhanced operations will result in reduced congestion and higher capacity.

Challenges:

1. Cyber security for cloud-based network will be required.
2. Will require public support for technology

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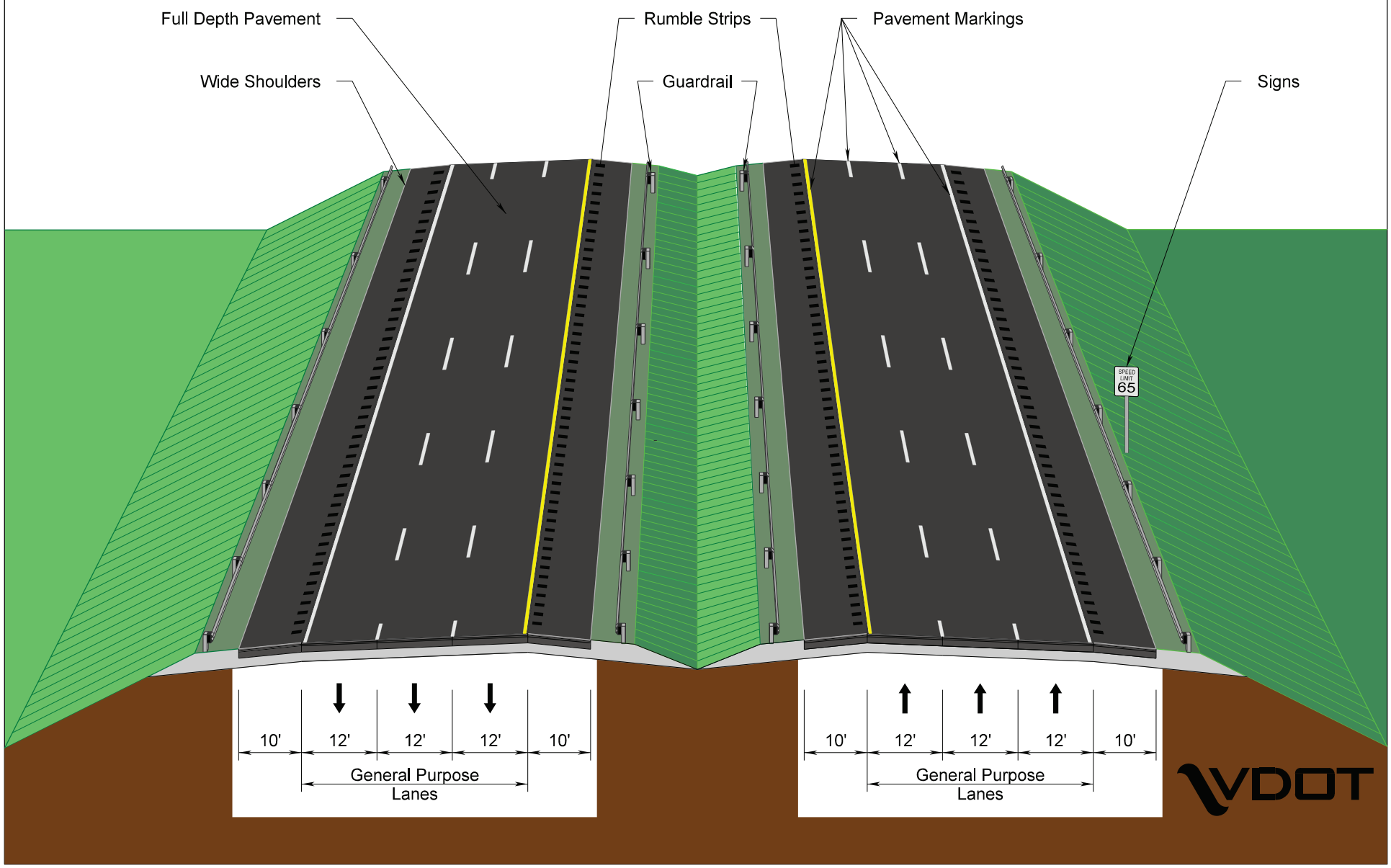
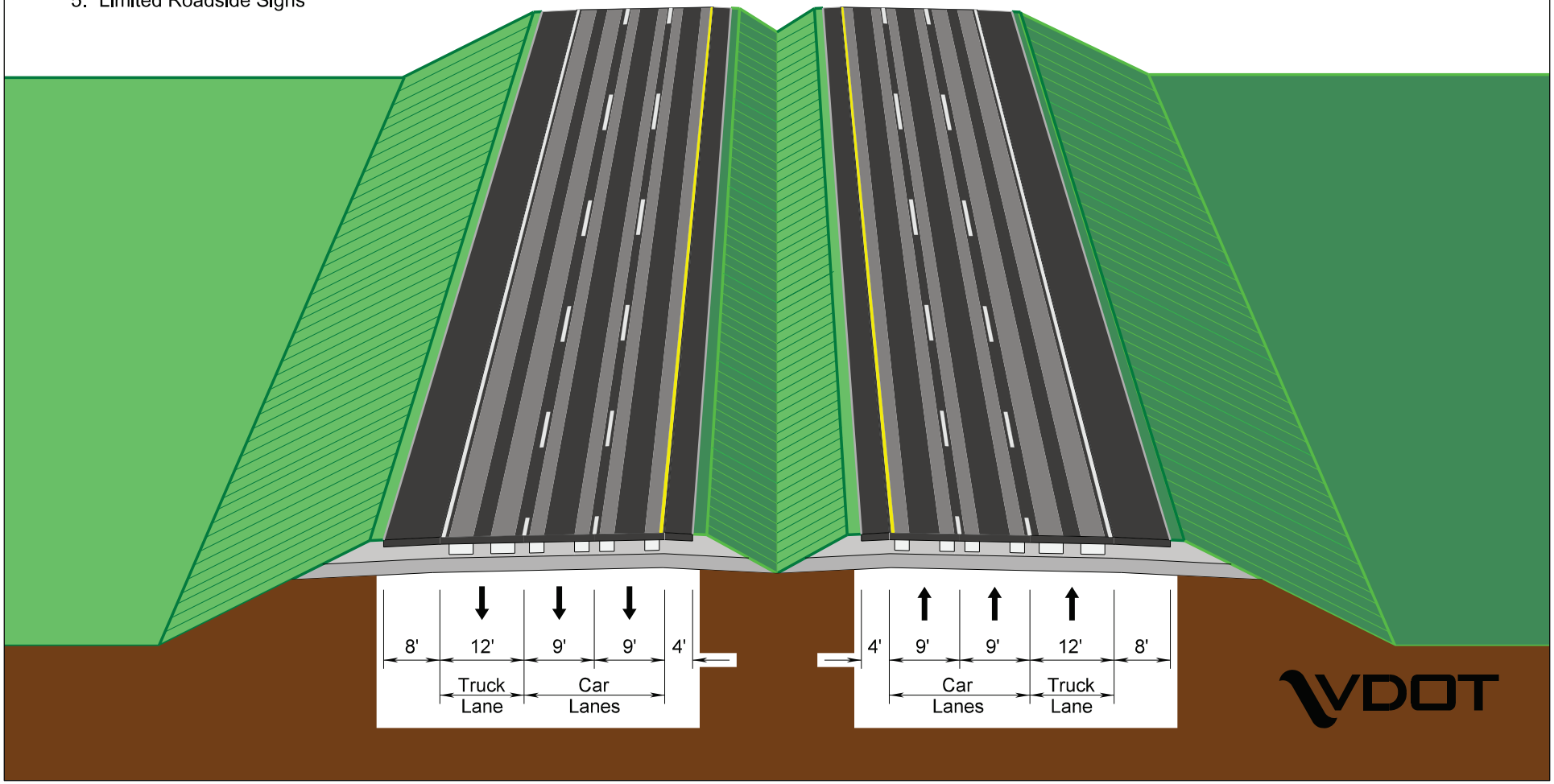
Current Limited Access Arterial Typical Section
Six Lane Divided Highway
Initial Discussion Draft



Future Limited Access Arterial for Automated Vehicles
Six Lane Divided Highway
Initial Discussion Draft

Features:

1. Wheel-Path Pavement
2. Narrow Shoulders
3. Limited Guardrail with No Rumble Strips
4. Enhanced Pavement Markings
5. Limited Roadside Signs



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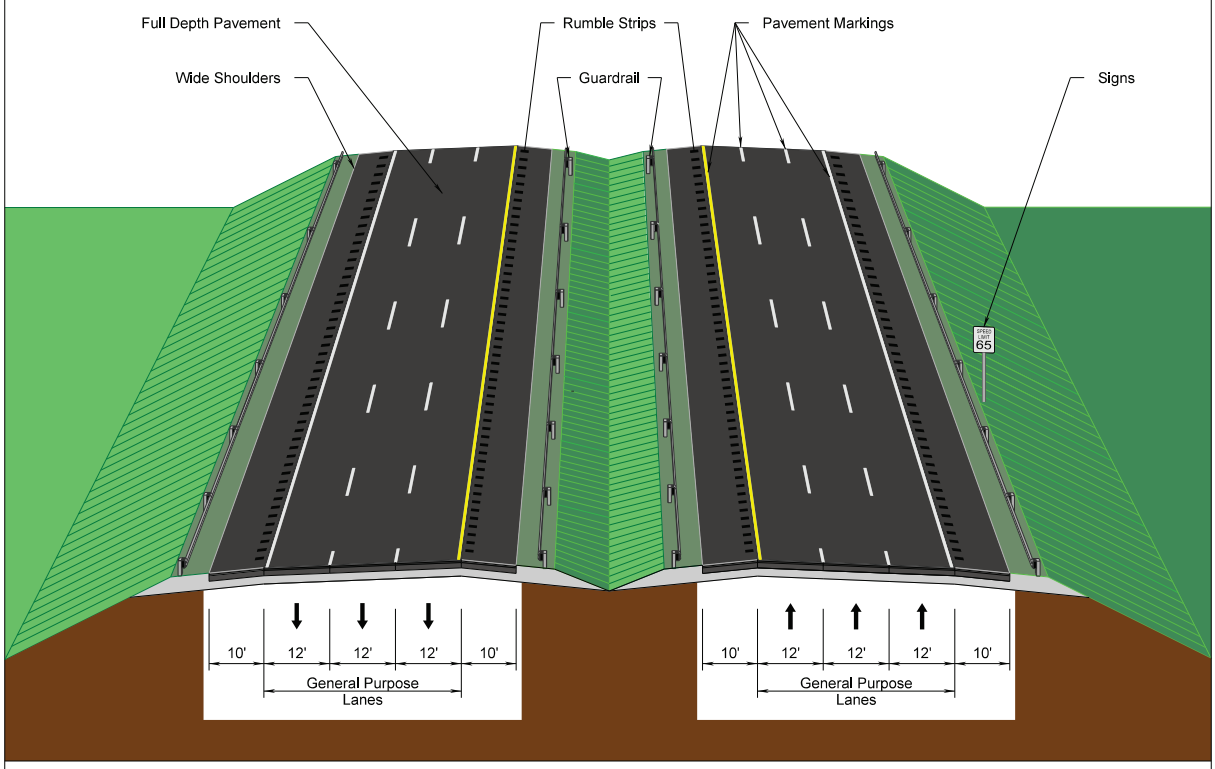
Current Limited Access Arterial Typical Section
Six Lane Divided Highway
Initial Discussion Draft



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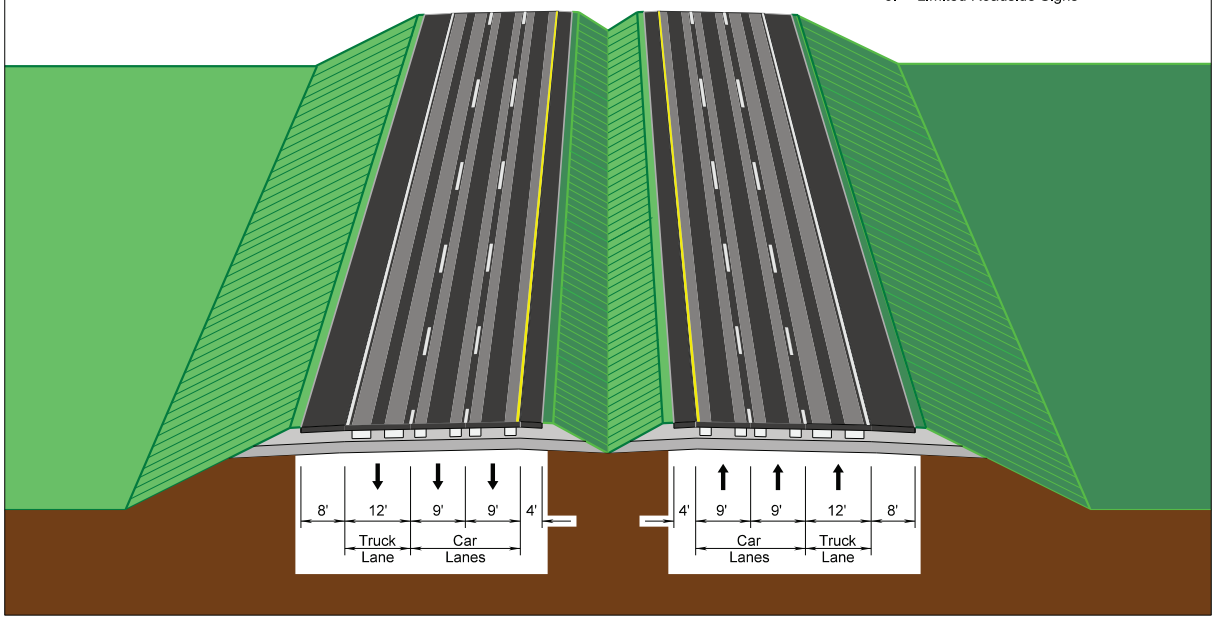
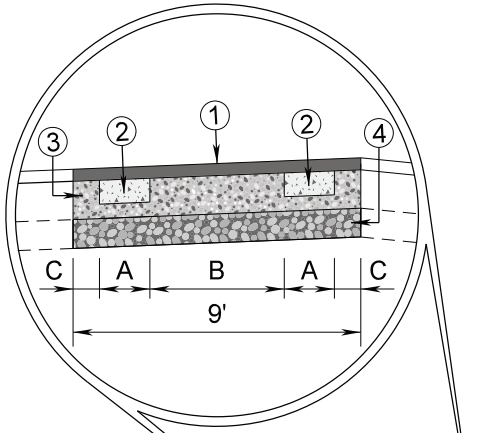
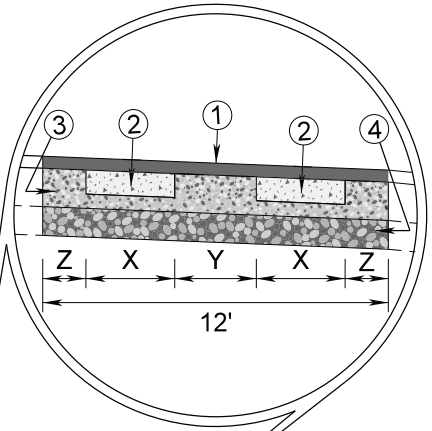


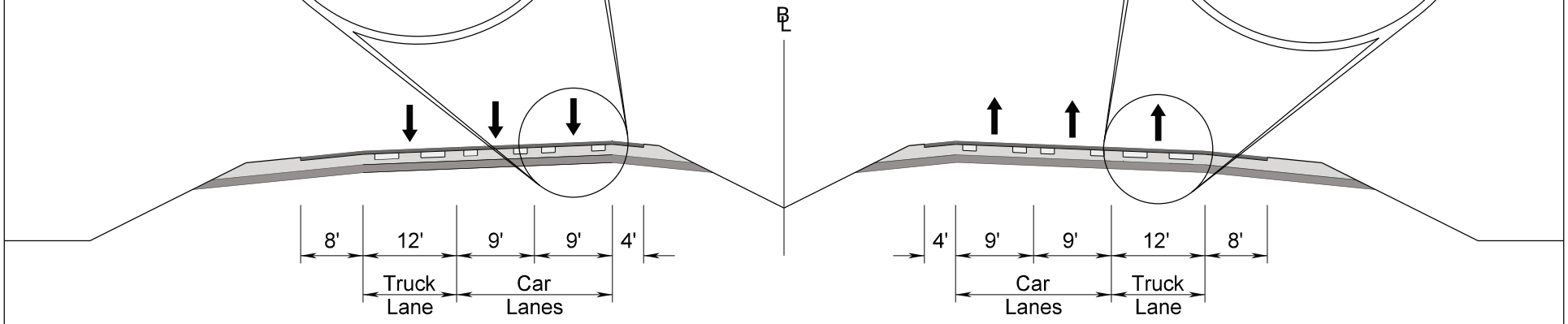
Future Limited Access Arterial for Automated Vehicles
Six Lane Divided Highway Typical Section
Initial Discussion Draft

Car Lanes Pavement



Truck Lane Pavement





Proposed Pavement Design
① Perpetual Asphalt Concrete Pavement (5" Depth)
② Continuously Reinforced Concete Pavement (10" Depth)
③ Cement Treated Aggregate Course (16" Depth)
④ No. 1 Stone Open Graded Drainage Layer (12" Depth)

Dimension Table	
Car Lane	Truck Lane
A = 1.7500'	X = 3.0833'
B = 4.6667'	Y = 2.8333'
C = 0.4167'	Z = 1.5000'

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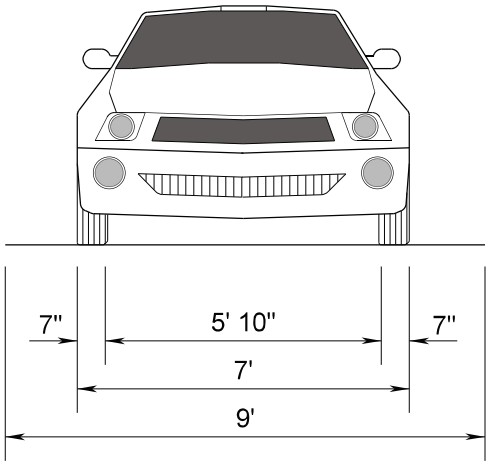
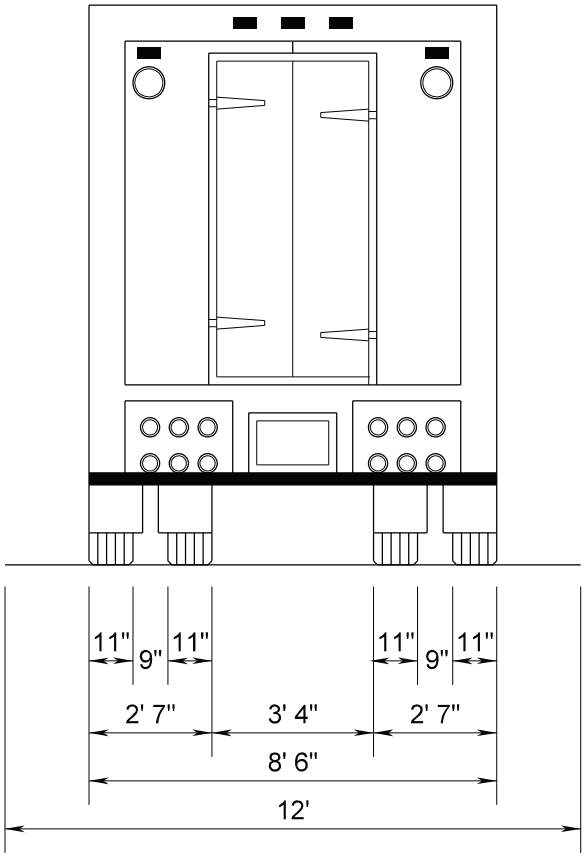
Design Vehicles
Initial Discussion Draft



AASHTO 2011 Passenger Car
FHWA Class 2 Vehicle
ISO/TC 22 Road Vehicle Standards



AASHTO 2011 WB-62 Semitrailer Truck
FHWA Class 9 Vehicle
ISO/TC 22 Road Vehicle Standards