Mendenhall Glacier Visitor Center

Bus Management Solution

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LIST OF ABBREVIATIONS

ADOT& PF	Alaska Department of Transportation & Public Facilities
Big 2	Holland America/Princess Alaska and Alaska Coach
Center	Mendenhall Glacier Visitor Center
ITS	Intelligent Transportation Systems
RFID	Radio Frequency Identification
TNF	Tongass National Forest
UHF	Ultra High Frequency
WTI	Western Transportation Institute

1. INTRODUCTION

The Mendenhall Glacier Visitor Center (Center) is one of the most visited public recreation sites in the state of Alaska. Half a million visitors a year, arriving mostly aboard tour buses, cause the Center to experience problems with crowding, traffic congestion and vehicle-caused air pollution. Large peaks in visitation, typically occurring about mid day during the middle of the week, result in pedestrian and vehicular congestion at multiple locations. The existing circulation pattern mixes private vehicle, tour bus, bicycle, and pedestrian traffic. Current traffic congestion degrades the visitor experience with delays, bus noise, and exhaust fumes.

The solution to the congestion is active management of tour bus arrivals and departures. Bus management will be accomplished by a combination of a reservation system, an automated traffic management system. This solution is based on a five year time-frame, although the solution could operate for a longer period of time. The solution is based on the existing infrastructure at the Center, including the number of parking spaces available for vehicles (buses) at the Center. This document presents the solution that was selected by the Tongass National Forest after a review of three main management options.

Previous documents related to this project include Technical Memorandum #1; the Concept of Operations document, the Functional Requirements document, and the Bus Management Options document.

Information from those documents is not necessarily included herein, but is data that the staff at the Tongass National Forest used to decide which solution option to select.

2. SELECTED SOLUTION

The selected solution, initially noted as Option 3B, uses in-ground sensors and signage to let buses know if spaces are available in the teardrop lot for the loading and unloading of passengers. The buses of the Big 2 operators are further managed through the use of a "reservation system" that would allow buses to be scheduled for their arrival and departure times. Finally, in an effort to ensure that buses unloading passengers are not delayed, two spaces in the Second Lot will be used for unloading purposes only.

The interceptor lot will be used for buses that are queuing to go up to the teardrop lot to pick up passengers. Therefore the lot configuration is important for what it can and cannot accommodate. Figure 1 shows the envisioned lot layout from a proposed paving project with five parking spaces at the southeastern perimeter and diagonal parking in the middle of the lot. Unfortunately, paving the entire lot was not possible due to project funds, and as a result it is now planned to be primarily a gravel surface. Hence any type of in-ground detection may require a localized surface treatment such as asphalt or cement. In addition, temporary traffic control devices, such as removable (plastic) jersey barriers, cones, etc., are likely necessary to ensure that the configuration of the lot resembles what was considered for a paved solution. Figure 1 also highlights possible queuing areas for the buses, which may be necessary depending upon the solution selected.

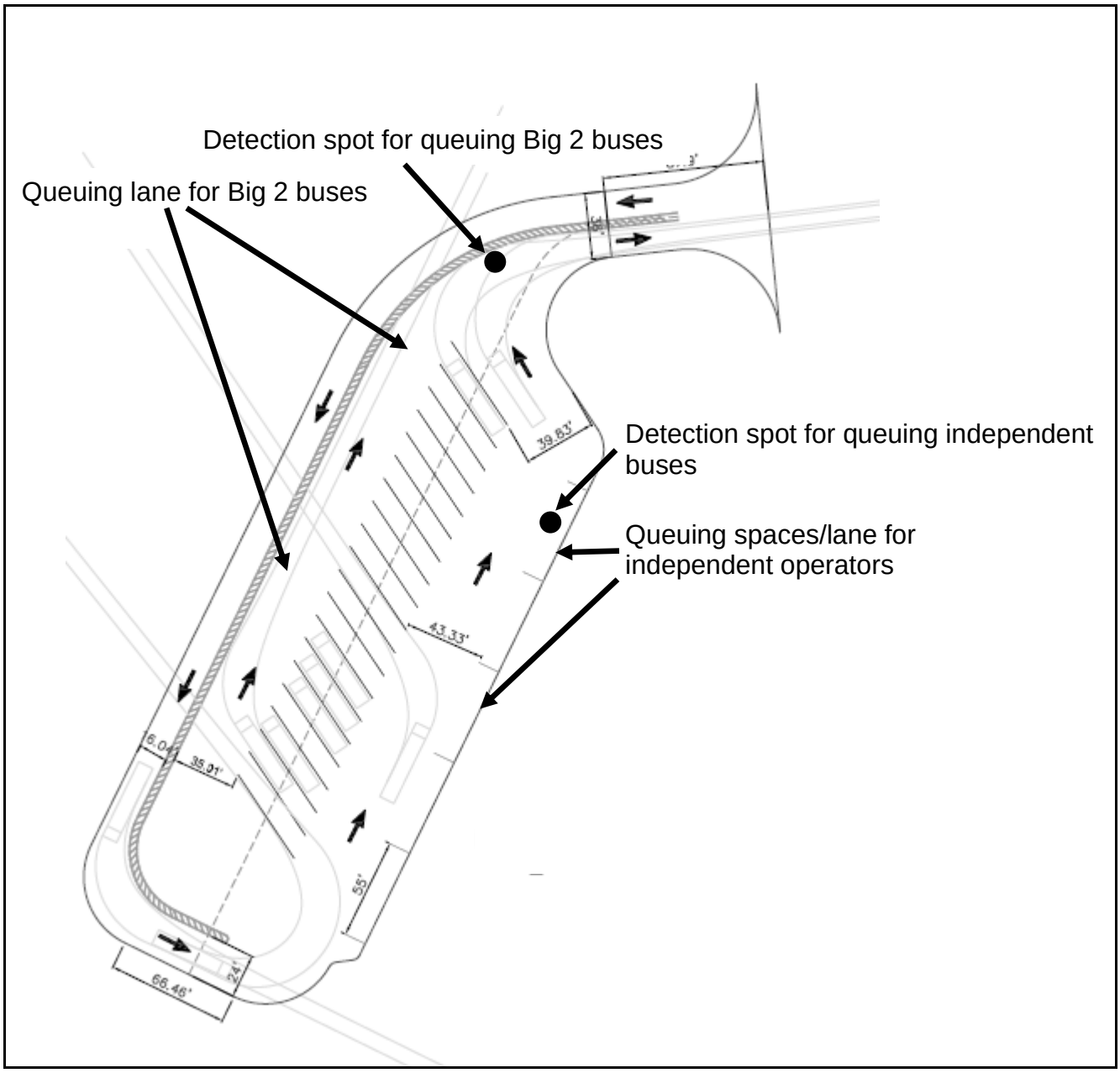

Figure 1: Configuration of Interceptor Lot

This solution will use detectors in the six parking spaces at the teardrop, and two in the interceptor lot to determine occupancy of those spaces. A controller would then determine how many spaces were available, and would notify bus drivers approaching the Center on Glacier Spur Road, or in the interceptor lot, if a space was available. Notification to drivers would be through "signage" alongside Glacier Spur Road and within the interceptor lot. This system would not differentiate between the Big 2 and independent buses, but would only detect the presence of buses in the spaces at the teardrop, or queued in the interceptor lot. The

controller will need to be programmed to account for the lag time traveling between the interceptor area signage and detection in a teardrop area space.

Figure 2 shows the types of equipment required for the variations of option 3.

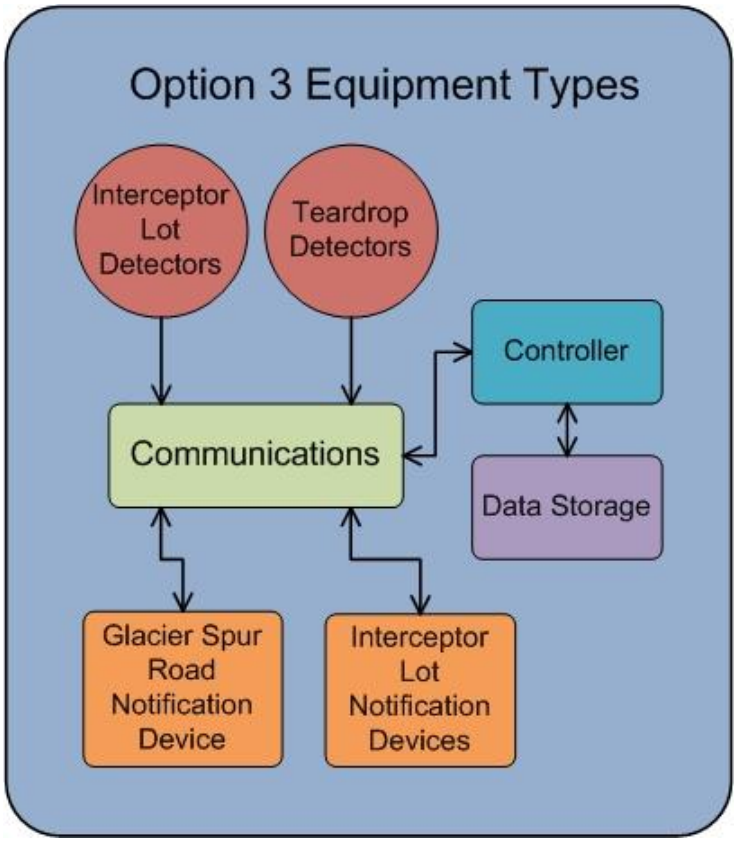

Figure 2: Required Equipment Types

A functional diagram of option 3 is shown in Figure 3.

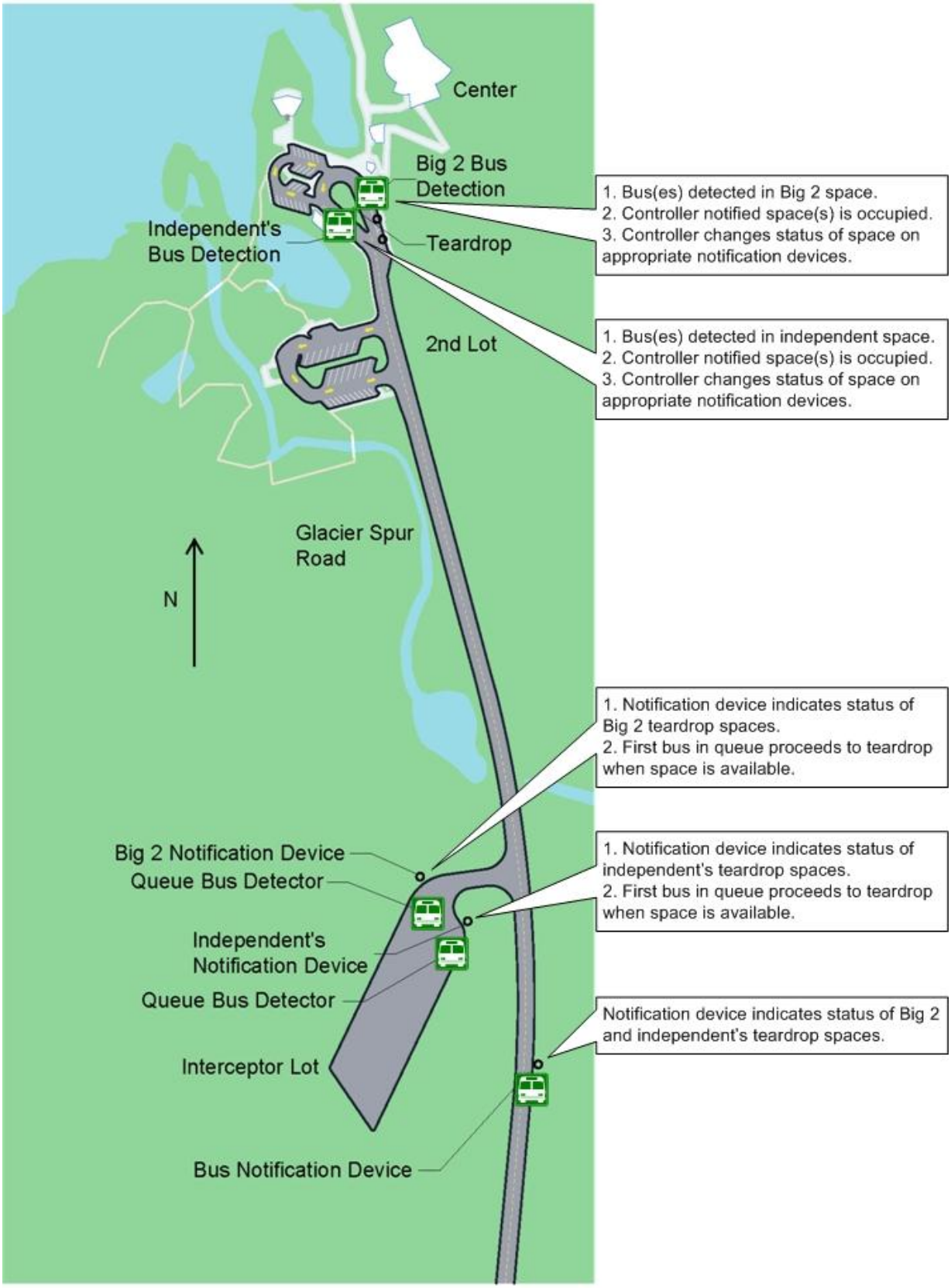

Figure 3: Solution Functional Diagram

As noted previously, the solution would use in-ground sensors to sense the presence of a bus in the parking spots at the teardrop, and in the queuing areas of the interceptor lot. These detectors would send information to a controller, which would use in-ground signage to notify bus drivers whether they could proceed along Glacier Spur Road to the Center, or, if they had passengers on board, to use the Second Lot to unload. Once in the interceptor lot this system would notify bus drivers through signage when a space at the teardrop was vacated, so they could proceed to the teardrop to load passengers.

There will need to be paving of two queuing areas in the interceptor lot (one for the Big 2 operators, and one for the independent operators).

Table 1: Solution Overview

General Description	Detection of eight spaces (six in the teardrop lot, 2 in the interceptor lot) with groundhog type sensors, and signage on Glacier Spur Road and in the interceptor lot for the Big 2 and independent operators
Equipment Costs	
Computer, Support Equipment at VC	$80,600
Detection	$32,300
Roadside Notification	$50,400
Total Cost	**$163,300**
Annual Maintenance Costs	$3,100
Advantages	Simple installation of detection equipment, low maintenance requirements (cost), ability to use wireless communication
Disadvantages	Signage on Glacier Spur Road, sensors must be removed if parking lot/roadway is resurfaced
Comments	Communication is required between the Center (controller) and the notification signs and detectors near/in the interceptor lot

Table 2: Basic Equipment List

Equipment Type	Quantity	Description
Vehicle (Bus) Detectors/Sensors	8	6 in-ground detectors in the teardrop lot, and two in the interceptor lot
Controller	1	Takes input from the detectors/sensors, and determines what "message" to put on the signage on Glacier Spur Road or in the interceptor lot
Reservation System	1	A basic system that would allow an individual to schedule the Big 2 buses for loading and unloading passengers in the four spaces in the teardrop lot.
Signage – Glacier Spur Road	1	A sign on the road that will indicate to the bus drivers how many spaces are available in the teardrop lot for either the Big 2 (maximum four spaces available) or the independent operators (two spaces maximum)
Signage – Interceptor Lot	1 (or 2)	The sign (or signal) would indicate whether a space is available for an independent or Big 2 bus to proceed to the teardrop lot to load passengers
Misc.		
Installation		Installation of detectors/sensors, communications network, and signage. May need to have asphalt or cement poured in interceptor lot for two detectors/sensors.
Construction		Possible construction in the Second lot to ensure loading space for two buses. The Second Lot will be used as "overflow" for unloading only.
Traffic Control Devices	?	We may need cones, or some other type of devices in the interceptor lot to delineate parking areas, and especially the queuing areas.