IMR Long Range Transportation Plan:

Transportation in Context

Needs Assessment

Technical Report

6/7/2013

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PURPOSE

This technical report identifies existing and future transportation needs for the Intermountain Region as part of the long range transportation plan (LRTP) pilot project. The planning horizon is 2035. The results of this needs assessment will be incorporated into the final plan.

The report examines both programmed and unfunded needs in the near-term (2012-2017) and the long-term (2018-2035) that have previously been identified by the Intermountain Region. Those identified needs may not fully address all goals of the long range transportation plan. The report is partially based on *Baseline Conditions (January 2013)* a technical report completed as part of the long range transportation plan process. Other emerging needs have been identified in *Changing America: Macro Trends for Transportation (October 2012)*, also a technical report in the series supporting the LRTP. The financial outlook is documented in *Financial Analysis Draft Technical Report* (May 9, 2013).

URS developed additional needs projection models based on best industry practices specifically for this LRTP and are explained in the Appendix: Needs Estimation Methods and Assumptions.

LONG RANGE TRANSPORTATION PLAN GOALS

This needs assessment forecasts planning level costs to manage and improve transportation in context with all five planning goal areas:

- Asset Management.
- Mobility, Access, and Connectivity.
- Visitor Experience.
- Resource Protection.
- Sustainable Operations.

See *Foundation for the Long Range Transportation Plan (April 2011)* for discussion of the process to select planning goals. This technical report also compares estimated needs with estimated funding expected to be available over the life of the plan and the resulting gap. Estimated funding for the long range transportation plan is fully described in the *Financial Analysis Draft Technical Report (May 2013)*.

NATIONAL PARK SERVICE CAPITAL INVESTMENT STRATEGY

The National Park Service (NPS) has developed and is now implementing implementing a Capital Investment Strategy (CIS) to help guide decision making in a fiscally constrained environment. The strategy seeks to preserve and maintain assets in the most sustainable way.

> *The National Park Service Capital Investment Strategy is a customized strategy for evaluating and prioritizing capital investment projects. At its foundation is an ability to support financial sustainability goals. It aligns with current Department of the Interior criteria for facility investment and remains consistent with existing Office of Management and Budget guidance. The strategy leverages the full power of the Facility Management Software System - the NPS asset management database developed over the past decade - and other related systems to ensure the financial sustainability of assets and to link project funding eligibility with a commitment to life-cycle maintenance. Scheduled for implementation on October 1, 2012, it will apply to projects funded in fiscal year (FY) 2015 and beyond, and will protect the historic fabric of the most treasured NPS assets - as well as mission-critical infrastructure - making optimal use of taxpayer dollars.*
>
> - *NPS Capital Investment Strategy Guidebook: Goals, Objectives and Functional Elements, July 2012.*

Re-optimization

The Capital Investment Strategy employs a process within Park Asset Management Plans to evaluate and rank maintenance projects. The process, known as "optimization," assigns a "band" to each asset based on its priority, or criticality, to the park mission along with a condition rating. The concept allows programming of maintenance funds to follow this assessment of need, and help ensure that the most important assets are maintained at appropriate levels.

Assets are assigned to an optimizer band based primarily on two default factors: (1) the asset rating on the park's API, and (2) the condition of the asset, as measured by the facility condition index (FCI). However, parks can apply additional discretion in assigning locations to optimizer bands based on local maintenance priorities. Optimization is a triage framework for allocating limited Operations and Maintenance (O&M) project funds. High-priority assets in good condition should receive priority O&M funding, particularly preventive maintenance, to keep them in good condition; low priority assets in bad condition should be disposed entirely; high-priority assets in poor condition should be targeted for repair with project funds, and then properly maintained. *(NPS Capital Investment Strategy Guidebook: Goals, Objectives and Functional Elements, July 2012)*

Figure 1. CIS Optimization of Priorities uses Banding Approach

Band 1	Highest Priority Assets	Critical to the operations and mission of the park or have high visitor use; require highest base funding
Band 2	High Priority Assets	Very important to park operations; require significant base funds
Band 3	Medium Priority Assets	Important to park operations and mission; require some base funding
Band 4	Low Priority Assets	Less important, but valuable for park operations and mission
Band 5	Lowest Priority Assets	Assets not required for the operations and mission of the park, such as inactive assets, or those fully maintained by partners. These assets are often in poor condition. Many are good candidates for disposal

Five major parks (GLAC, GRCA, ROMO, YELL, and GRTE) in the Intermountain Region have completed or begun a re-optimization process designed to refine the original assignment of assets to bands. The remaining parks in the region are expected to complete the process by the end of 2014.

Under the CIS, optimizer bands will continue to guide prioritization of O&M expenditures, but they will also play a significant role in determining which assets will obtain project funds. This raises major considerations for the NPS and necessitates new optimization business practices to achieve the following:

- Provide guidance to parks on the evolving use of optimizer bands
- Ensure the integrity of the new linkage in the CIS between project funding and the proper maintenance of those assets that receive project funding.

As optimizer bands become well integrated into overall capital and annual management planning within the parks, greater control is required to ensure that any optimizer band changes are consistent and merited with regard to future capital investment. To ensure this, all optimizer band changes will require approval by the appropriate regional director or his or her designee. This review requirement will mirror the process for approving changes to location API ratings.

Long Range Transportation Plan Support for the Capital Investment Strategy

The IMR LRTP scope of work (contract) was awarded in August 2010, prior to full development and rollout of the Capital Investment Strategy in July 2012. The IMR LRTP postponed substantive work on the Needs Assessment and Financial Analysis until the CIS was rolled out. Because provisions in the IMR LRTP scope of work, the CIS will be primarily addressed during the next phases of LRTP development (scenarios, strategies, and future project prioritization criteria phases) vs. the current needs assessment phase.

The CIS is integrated in the needs assessment methodology and findings to the greatest extent possible, considering Total Cost of Facility Ownership over the life of the 20-year plan, use of CIS tools such as FMSS, AFS, and optimizer bands, and particularly in the approach to how to best achieve the goals of the project. The IMR LRTP has not prioritized the planning criteria under which the project was developed, so the CIS will be considered alongside other current NPS policies such as the Call to Action, Healthy Parks Healthy People, etc.

The Capital Investment Strategy promotes four mission goals very similar to goals selected for the long range transportation plan. Figure 2 shows the link between the Capital Investment Strategy and the long range transportation plan, especially in the area of needs assessment, the subject of this report.

Figure 2. How the LRTP Supports the Capital Investment Strategy

CIS Mission Goals	LRTP Goals	LRTP Support
Financial Sustainability	Asset Management Sustainable Operations	The largest projected costs are in the areas of Maintenance, Operations, and Component Renewal/Recapitalization. These three areas together address the total cost of facility ownership (TCFO) as a subset of need. Maintaining current assets that are required to meet the NPS mission in the most cost effective way is seen as a primary driver for the plan. Capital/New Construction costs are anticipated to be small. The plan balances the potential costs of removal/decommissioning of assets with maintenance costs, resource impacts, park management needs, and visitor experience.
Resource Protection	Resource Protection	Investment in support of this goal is a given, with the primary requirement to avoid or mitigate damage. Preservation of historic transportation facilities is recognized as a major cost as is limiting resource impacts from other transportation facilities. The expansion of facilities into undisturbed areas is not encouraged and the removal of unnecessary assets is considered a benefit.
Visitor Use	Mobility, Access, & Connectivity Visitor Experience	The LRTP addresses visitor needs for transportation and the consequent experience in the park. The plan includes all transportation modes, signage and wayfinding, connections among modes, and connections to communities. It attempts to capture how transportation relates to visitor experience.
Health and Safety	Mobility, Access, & Connectivity Visitor Experience	These two LRTP goals encompass the health and safety of visitors when traveling in parks. The plan is multimodal, including private vehicles, transit systems, and to some extent pedestrians and non-motorized transportation. Transportation investments that improve safety are a priority.

Total Cost of Facility Ownership (TCFO)

TCFO analysis documents the large difference between the initial price of an asset and its long-term costs. It is a primary tool used by CIS to determine priorities. Decisions should be based on the total cost of ownership over time, not just the initial costs. TCFO uses life-cycle cost analysis, taking into account all costs of acquiring, owning, and disposing of a building or other type of facility. TCFO analysis can be used to support acquisition and planning decisions for a wide range of assets that carry significant maintenance or operating costs across a long usable life. TCFO includes:

- Recurring Maintenance.
- Preventive Maintenance.
- Facility Operations.
- Component Renewal.
- Unscheduled Maintenance.
- Project Planning.

KEY FINDINGS BY GOAL AREA

The following key findings identified in this report are listed by goal area.

Figure 3. Key Findings by Goal Area

Key Findings by Goal Area	
Asset Management	85% of future needs calculated in this needs assessment are pavement related, but only 33% of pavement assets are scheduled for treatment from 2011-2020. As costs are pushed to the future, they become more expensive. These accelerating costs have multiple implications: • Pavement maintenance and rehabilitation costs are not sustainable. • Pavement condition targets are not likely to be attainable under expected funding. The National Park Service should re-evaluate pavement and other asset related targets and goals. • Maintenance costs, when deferred, are transferred to Component Renewal/Recapitalization over time. • A Capital Investment Strategy type future scenario may limit the ability to invest in other NPS mission goals such as visitor experience, resource protection, and mobility.
Mobility, Access, and Connectivity	NPS policies such as the Call to Action, recommend strengthened connections to surrounding communities and better access to parks. This goal may be at odds with the current focus on asset conditions and an evolution to preserving key aspects of the transportation system in acceptable condition..
Visitor Experience	Visitor experience is clearly impacted in a negative way by congestion, safety concerns, and poor asset conditions. Asset management needs, including massive maintenance and component renewal/recapitalization, readily absorb much of the available funding, leaving historically important projects to improve visitor experience underfunded. Significant gains toward positive visitor experiences through major investments would necessarily come at the expense of other programs, i.e., asset management.
Resource Protection	Costs for resource protection related to transportation are not typically separated from transportation projects, but are completed during the course of the project. This makes it difficult to assign costs separately for these critical needs. The assumed costs are high, especially related to preservation of historic resources, and often underestimated during project development. Under-estimated or otherwise hidden costs contribute to additional costs during a project, sometimes extending the timeframe for completion and causing further delays in other important projects.
Sustainable Operations	Total calculated needs are growing at the average annual rate 6.0%, far outpacing inflation. Most transit proforma indicate sustainable operations only through 2014, pending identification of sufficient funds, which may need to be drawn from non-typical sources. Such transfers could cause shortages in other areas of need. **The relative size of the gap between available funding and transportation costs is not dependent on the choice of future funding trend. Slowing growth in the gap is dependent on reducing Deferred Maintenance.**

GENERAL APPROACH

The general approach for the needs assessment was developed to answer these questions:

- What is the estimated cost at a broad level of all transportation-related needs in the region over the next 20 years?
- What is the gap between available funding and needed funding, for all transportation infrastructure, maintenance, and operations?

The general approach for the needs assessment follows five steps:

1. Analyze existing and future transportation needs based on FMSS, AFS, and other NPS sources, making necessary assumptions and projections where necessary to fill out the assessment to 2035.
2. Use a five–year history of project implementation as a basis to project future need.
3. Explore unmet needs, including transportation programs that are inadequately funded.
4. Collectively examine all needs and compare to available funding (identified in the *Financial Analysis Technical Report*) to identify the gap between anticipated funds and needs.
5. Establish Key Findings by goal area in a discussion of the implications of the identified gap.

See the appendix for complete methodology.

MAJOR ASSUMPTIONS

This technical report is based on a series of major assumptions as documented below. These assumptions are required to extend historical or near term future data from the transportation program to the required 2035 planning horizon.

Growth Rate

Growth in needs includes a 2.1% annual rate of inflation so as to provide Year of Expenditure (YOE) analysis. This inflation rate is consistent with current NPS practice and is selected for the inflation of financial resources and needs over time.

American Reinvestment and Recovery Act (ARRA)

The significant increase in expenditures within the Intermountain Region observed in 2009 is considered to be a result of the American Reinvestment and Recovery Act. This level of Congressional support is not anticipated to be repeated in the foreseeable future. In keeping with a reasonably conservative approach, as is appropriate for this long range transportation plan, the ARRA spike was not factored into the average funding baseline in the years 2007 to 2011 used as a basis for the financial and needs analysis.

Future Needs Based on Historic Obligations and Current Programming

The projections in this technical report assume an increase in needs from 2021 to 2035 based on programmed increases from 2011 to 2020, plus inflation. While the actual location and description of needs may rotate among parks, the type and value are expected to be similar over time.

Alternative Transportation Systems (ATS)

This report assumes no new NPS-owned, operated, or maintained transit systems will be implemented during the planning period due to the accelerating costs of transit operations, the perceived instability of future transit funding, and this report's attention to the Capital Investment Strategy that is likely to curtail major new investments.

- Transit needs for existing alternative transportation systems are extended cyclically from current proforma forecasts that end in 2014-2015, plus inflation.
- Funds for transit operations beyond 2014 do not appear to be adequate through current programs and will go into deficit unless new funding is identified or drawn from other programs. Transit needs beyond 2015 in excess of 2014 funding levels register as unmet needs for the purposes of this analysis, even if required funds are eventually identified elsewhere and transferred to transit operations. Future planning scenarios may explore the implications of the transfer of other funds to essential systems.

Highway Pavement Management Application (HPMA)

Output from the Highway Pavement Management Application (HPMA), completed October 2011, was accessed to determine preferred pavement treatments for roads and parking areas. The HPMA analysis includes recommended treatments through 2020. Since pavement treatments are cyclical in nature, the needs assessment extends the costs of pavement treatments to 2035 based on recommended cycles, plus inflation. As will be shown, roadway pavement maintenance, rehabilitation, and reconstruction dominate future needs.

WORK TYPES FOR LONG RANGE TRANSPORTATION PLAN NEEDS ANALYSIS

In order to effectively assess long range transportation needs, this analysis used a four-step process to arrange needs by type of investment. The end product allows needs to be organized by the five long range transportation plan goal areas.

1. Examine historic obligations by fund sources as tracked in AFS and PTATS. The average annual expenditure by work type was established and normalized to 2012 dollars.
2. Examine programmed projects by fund source as tracked in PMIS. The average annual expenditure by work type was established and normalized to 2012 dollars.
3. Organize expenditures in asset type groups on which the various fund sources may be expended.
4. Organize asset type groups in work types.

The resulting matrix of work types is shown in Figure 3, Intermountain Region Work Types for LRTP Needs Analysis.

Figure 4. Intermountain Region Work Types for LRTP Needs Analysis

Intermountain Region Work Types for LRTP Needs Analysis				
Maintenance	Component Renewal/ Recapitalization	Capital Improvement/ New Construction	Transit Operations	Planning
Roads Overlooks/Vistas Parking Bridge Signage Trails (Multiuse/Connector/Urban) Culverts/Drainage Guardrail ONPS (park maintenance) Traffic Controls Transit Transit Shelters Transportation Buildings	Roads Parking Transit Bridge Signage Culvert/Drainage Guardrail Overlooks/Vistas Traffic Controls Vehicle Wash Transportation Buildings	Roads Parking Guardrail ITS Traffic Controls Transit Shelters Transportation Buildings	Transit Operations	Roads Transit GMPs Transportation Plans

The work types represent major transportation activities undertaken by the Intermountain Region. It is important to note that each asset type may be addressed in some way by one or more work types. For instance, the asset type "roads" may have needs that include several or all work types: Maintenance, Component Renewal/Recapitalization, Capital Improvement/New Construction, and Planning. These work types are consistent with those employed in the Financial Analysis and with WASO guidance.

Maintenance includes the following:

- Preventive Maintenance (PM): regularly scheduled periodic maintenance activities (within a year) on selected assets; includes non-structural surface treatments less than 1.5" in total thickness.
- Regular and Recurring Maintenance (RM): work activities that recur based on normal wear patterns on a periodic cycle of greater than 1 year and less than 10 years.
- Deferred Maintenance (DM): maintenance that was not performed when scheduled and is delayed. Continued deferment of maintenance will result in deficiencies.
- Maintenance on transit-related structures.

Component Renewal/Recapitalization includes the planned replacement of a component or system that will reach the end of its useful life based on condition and life cycle analysis within the facility's lifetime. This includes Light Rehabilitation (L3R) or pavement rehabilitation without grade improvement, and Heavy Rehabilitation (H3R) including grade improvements, as well as cyclical transit and other fleet recapitalization. Major recapitalization (4R) construction, including widening and other modification of existing assets in the existing alignment is also included in the work type.

Capital Improvement/New Construction includes major new construction projects and investments where none previously existed. Recent and planned Capital Improvement projects have included bike paths and other missing elements of the non-motorized transportation system. It also includes new transit facilities such as transit stops, shelters, wash facilities, etc.

Transit Operations includes costs to operate the five NPS-owned and operated systems in the Intermountain Region, plus the vendor-operated shuttle system at Mesa Verde National Park. It does not include operational costs for vendor-operated systems in other parks, which are self-supporting and not funded directly by the National Park Service. Transit capital needs are included in the Component Renewal/Recapitalization work type.

Planning includes regional and park-level transportation plans, transportation planning support for general management plans, and environmental planning (NEPA) support.

NEEDS ASSESSMENT METHODS

Existing needs were calculated based on current formulated project lists in the Federal Lands Highway Program, the Highway Pavement Management Application report, the NPS Bridge Management System, Alternative Transportation System proformas, and the Intermountain Region Transportation Program. Obligations in FMSS were assumed to be the total of "met" needs for the region. "Unmet" needs were calculated by extending current needs into the future at the rate of inflation (2.1%). All historic obligations were normalized to 2012 dollars. See Appendix for a more complete discussion of methods used in completion of this report.

FINANCIAL MANAGEMENT SOFTWARE SYSTEM

Programmed expenditures through the year 2017 were queried from FMSS and distributed to the work types described above.

HIGHWAY PAVEMENT MANAGEMENT APPLICATION

The Highway Pavement Management Application (HPMA) report developed by the Federal Highway Administration (October 2011) specifically for the Intermountain Region contains recommended pavement maintenance strategies for all roadway segments. It includes the type of treatment, cost, pavement condition rating, and priority, either in a fiscally constrained list or an unconstrained list, as generated by the most recent (RIP Cycle 4) analysis. This report serves as the foundation for all pavement-related needs.

A separate report was generated for Yellowstone National Park and incorporated into this needs assessment. Estimated treatment costs for all assets not included in the transportation program were summed to develop the total unmet need for Component Renewal/Recapitalization and Maintenance functions. Based on the HPMA report, Heavy 3R and Light 3R treatments are all considered Component Renewal/Recapitalization, and Preventive Maintenance treatments are considered Maintenance.

Total maintenance costs were estimated using a hybrid method. Several methods were considered in the development of the NPS National Long Range Transportation Plan and discussed in a supporting document. *(White Paper: Estimating Operations & Maintenance Costs for the Servicewide Transportation Asset Inventory/National LRTP; Booze Allen Hamilton; March 26, 2013).* The needs assessment report utilizes methods discussed in the white paper as a check. One method discussed in the white paper uses 2% of current replacement value as a surrogate for long range maintenance needs. While this method produces relatively high costs, this needs analysis uses the 2% CRV replacement value to help establish the high range of projected maintenance costs.

HPMA estimates for the 2011 and 2016 program years were used to estimate the accumulation of deferred maintenance and overall infrastructure needs through 2035. Cost estimates for roadway and parking assets that are not scheduled for treatment in either program cycle were used to calculate the cyclic rate of deferred maintenance increase and repeated out to the year 2035. These estimates were then adjusted for inflation since HPMA data is calculated in year 2011 dollars.

BRIDGES

The NPS Pontis report, output from the bridge management system, was used to establish 2012 deferred maintenance costs for 205 bridges and tunnels within the Intermountain Region. Pontis provides only current year data and is not used by the NPS as a long range needs analysis tool for all

maintenance costs. The Pontis deferred maintenance costs were compared to other cost estimating models for use in the future needs assessment.

UNFORMULATED NEEDS

Unformulated projects through 2017 were initially used to track documented project needs registered in PMIS and to establish previously identified projects that have not yet been completed or programmed. However, the unformulated needs were determined not to represent the entire breadth of needs within the IMR. As a result, the list of unformulated needs in PMIS was not explicitly used in the determination and forecast of future needs. It was consulted to help establish the range and potential cost of improvement types.

ALTERNATIVE TRANSPORTATION SYSTEMS

A series of transit financial models and reports were completed for each of the Intermountain Region's NPS-owned and operated alternative transportation systems with the assistance of Booz Allen Hamilton. The plans addressed transit systems for five national parks:

- Bryce Canyon
- Grand Canyon
- Glacier
- Rocky Mountain
- Zion

The enhanced financial proforma model developed by Booz Allen Hamilton is intended to help the user analyze the financial feasibility of the ATS services at a National Park Service unit. The model forecasts ATS related cash flows, including operational needs and capital projects over a 5-year time horizon, based on assumptions entered by the user. The user chooses a baseline year to enter initial values in addition to assumptions related to future annual growth or specific expenditures and funding specific to the ATS. The model then calculates 5-year cash flow proforma (or forecast) based on these assumptions.

The model outputs include information about future annual net surplus/deficits, transportation fee fund balances, and FLREA summaries and charts. The model is intended to assist the user in making sound management decisions with regard to a park's alternative transportation system. The model used FY 2010 as the baseline year for actual expenditures and then projected out 5 years from the baseline. Output from the models is included in the needs assessment as cyclical repeating needs through 2035.

Transit operations unmet needs were calculated using the proforma documentation for the six major alternative transportation systems in the Intermountain Region. Transit operations will be solvent until 2014. As a result, no "unmet" needs were identified for operations during this time period.

Transit operations needs were calculated using the proforma documentation for the six major alternative transportation systems in the IMR. Most proformas indicated that transit operations would be solvent until 2014. After 2014, the difference between the estimated 2014 operations budget and the operations contract estimate was assumed to be the "unmet" need for operations. The total of unmet needs for the six ATS systems was considered the regional unmet need.

Additional transit needs for the vendor-operated shuttle system at Mesa Verde National Park were calculated using the NPS report *Alternative Transportation Systems (ATS) Financial Analysis Phase II, Volpe National Transportation Systems Center*, as background input to calculate growth in that system at the rate of inflation, similar to other LRTP components.

PLANNING

The current program of projects (through 2017) was used to estimate a current planning average need of $1 million per year. This need was increased by 2.1% (inflation) through 2035 to estimate long term planning needs. Planning needs in this category include feasibility studies for transit, multimodal congestion management and transportation plans, safety studies, visitor wayfinding and signage plans, visitor distribution and capacity studies, or other plans conducted at the park level. Planning activities are often supported by the Intermountain Region and the Denver Service Center. The LRTP identifies specific needs to develop and implement congestion and bridge management systems.

EMERGING NEEDS

All transportation related needs are included in this analysis at a broad level. This analysis does not propose individual projects for the future. Subsequent phases of this planning process, namely Task 7 – Planning Scenario Development, Task 8 – Refine Preferred Scenario, and Task 9 – Final Long Range Transportation Plan will determine the level of investment the Intermountain Region will pursue for all needs, including the appropriate strategies to balance investments in all goal areas. As shown in Figure 5, this needs analysis includes expenditures for project types needed to maintain and improve transportation over the long term.

Many emerging needs were identified in a previous technical report completed as part of this LRTP – *Changing America: Macro Trends for Transportation (October 2012)*. Please see the report for a complete discussion of the following topics:

- Effects of general demographic aging on transportation
- Lower rates of participation by the young and by ethnic minorities
- Electronic communication in the parks for visitors and park management
- Trends toward larger vehicles, desire for greater mechanized recreation opportunities, and shorter time-in-park
- Visitation spikes in large iconic parks, paired with flat or declining visitation to smaller parks
- Tour group impacts (private tours)
- Natural hazards risks, many of which are growing with the threat of climate change
- Movement toward sustainable operations at the park, regional, and national levels.
- Growth in deferred maintenance costs and the "zero sum" effect on NPS budgets
- Opportunities for partnerships to help support the parks.

These emerging needs are addressed as future costs to the extent that recent and current projects that have an assigned cost are expected to continue and are grown at the rate of inflation.

Costs to comprehensively address the long list of emerging needs have not been directly calculated for this pilot LRTP. However, it is critical to recognize the potential significance of adding costly new initiatives to the over-stressed budget. The planning scenario phase will determine what initiatives are critical for this plan, where required funding might come from, and what the potential consequences of not addressing such needs may be.

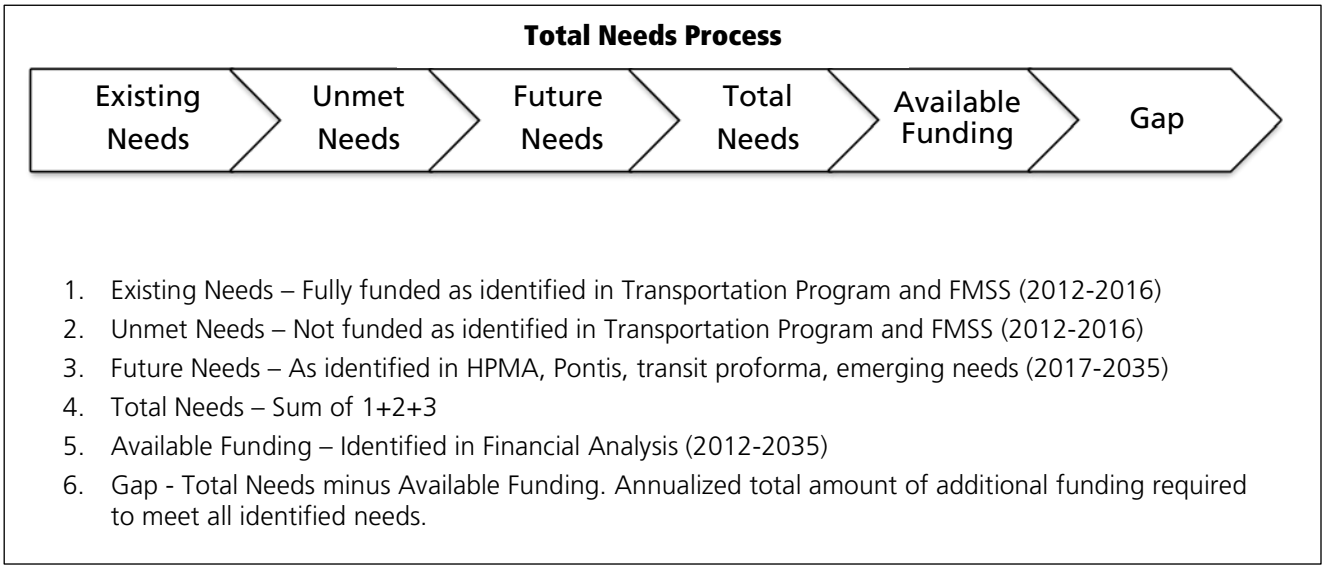
Figure 5. Transportation Elements Included in Needs Analysis

Transportation Elements Included in Needs Analysis	
Transportation Element	Included in Work Types
Asset management / system preservation (including, but not limited to the Pavement Management System, Bridge Management System, and FMSS)	These needs are included at a very detailed level and represent the largest set of needs by type in the plan. Maintenance Component Renewal/Recapitalization Capital Improvement/New Construction
Congestion management	Maintenance Component Renewal/Recapitalization Capital Improvement/New Construction Planning
Data collection, tracking and reporting and gap	Costs are not estimated. A section discussing these needs is included in the technical report.
Mobility (including ADA and ABA issues), access, and connectivity	Component Renewal/Recapitalization Capital Improvement /New Construction Planning
Multi-modal transportation system elements, including transit (buses and associated infrastructure), pedestrian and bicycle facilities and ferries and rail (where applicable)	Component Renewal/Recapitalization Capital Improvement /New Construction Transit Operations Planning
Natural, cultural and historical resources stewardship, including mitigation of negative impacts from transportation activities	Maintenance Component Renewal/Recapitalization Capital Improvement /New Construction Planning
Needs that may not yet be apparent, based on the Baseline Conditions Analysis and Macro Trends (for example, resource impacts and/or congestion from rising levels of non-visitor traffic) and additional investments in communication infrastructure	Component Renewal/Recapitalization Capital Improvement/New Construction Transit Operations Planning work
Operational issues: safety, congestion, parking, etc.	Component Renewal/Recapitalization Capital Improvement /New Construction Planning
Organizational efficiency	Treated as an additional need and discussed as a topic of exploration.
Planning	Planning
Safety	Component Renewal/Recapitalization Capital Improvement/New Construction Planning
Transit (buses and associated infrastructure)	Component Renewal/Recapitalization Transit Operations
Transportation enhancements	Component Renewal/Recapitalization Capital Improvement/New Construction Planning
Visitor experience, including wayfinding/signage (orientation), and quality of service	Maintenance Component Renewal/Recapitalization Capital/New Construction Transit Operations Planning

Total Needs

This analysis calculates the sum of all needs from 2015 to 2035, using the building block process described in the following figure. The process added the sum of existing, unmet, and future needs to equal total needs. The total needs were then compared to available funding (discussed in the *Financial Analysis Technical Report*) to determine the gap between needs and funding. The gap will be addressed in the next phases of the long range plan process.

Figure 6. Total Needs Process



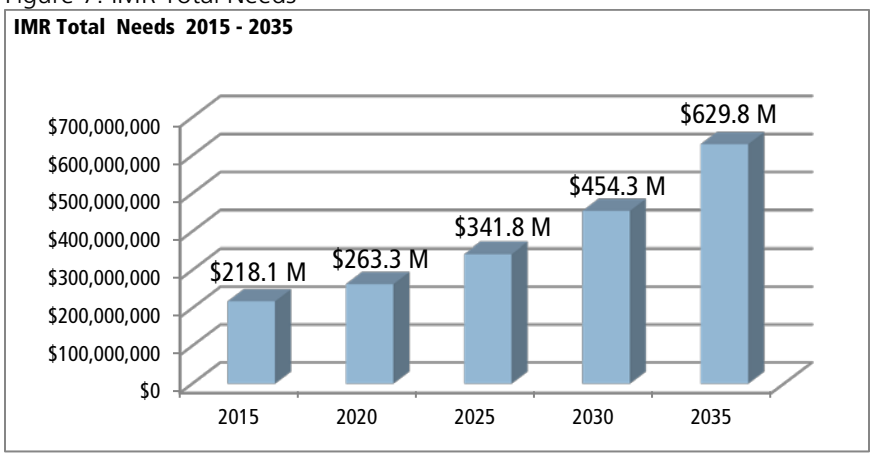
1. Existing Needs – Fully funded as identified in Transportation Program and FMSS (2012-2016)
2. Unmet Needs – Not funded as identified in Transportation Program and FMSS (2012-2016)
3. Future Needs – As identified in HPMA, Pontis, transit proforma, emerging needs (2017-2035)
4. Total Needs – Sum of 1+2+3
5. Available Funding – Identified in Financial Analysis (2012-2035)
6. Gap - Total Needs minus Available Funding. Annualized total amount of additional funding required to meet all identified needs.

TOTAL NEEDS (2015 – 2035)

INTERMOUNTAIN REGION

The total annual estimated needs for the Intermountain Region grow from $218.1 million in 2015 to $629.8 million in 2035, including inflation. The growth in needs results primarily from the compound effects of inflation and delays in addressing pavement rehabilitation that will eventually require reconstruction. All dollars are in Year of Expenditure (YOE).

Figure 7. IMR Total Needs



FOCUS PARKS

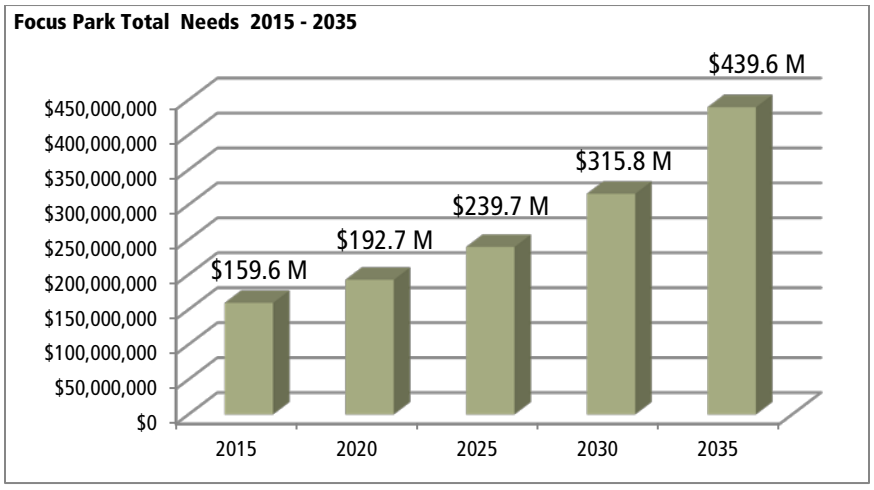
The Intermountain Region long range transportation plan has adopted the use of "focus parks" to help illustrate the effects on representative parks. The 12 selected focus parks include some of the largest, most transportation-intensive in the region and include all those with NPS-operated transit systems. The focus parks also include the variety of park typologies present in the Intermountain Region, such as rural/urban, desert/mountain, and cultural/natural resources. The analysis addresses the region as a whole and the 12 focus parks, including needs by work type. Approximately 80% of historic obligations have been allocated to the 12 parks. Approximately 28% of the total need is calculated for Yellowstone, alone. All other parks (non-focus parks) are included in the analysis as the remainder of the regional total minus the 12 focus parks. See *Baseline Conditions (January 2013)* for more information.

Figure 8. IMR LRTP Focus Parks

IMR LRTP Focus Parks	
Bryce Canyon NP (BRCA)	Chickasaw NRA (CHIC)
Glacier NP (GLAC)	Grand Canyon NP (GRCA)
Grand Teton NP (GRTE)	Mesa Verde NP (MEVE)
Rocky Mountain NP (ROMO)	Saguaro NP (SAGU)
San Antonio Missions NHP (SAAN)	White Sands NM (WHSA)
Yellowstone NP (YELL)	Zion NP (ZION)

The total annual estimated needs shown in Figure 9 for the 12 Focus Parks grow from $160 million in 2015 to $440 million in 2035. All dollars are in Year of Expenditure (YOE).

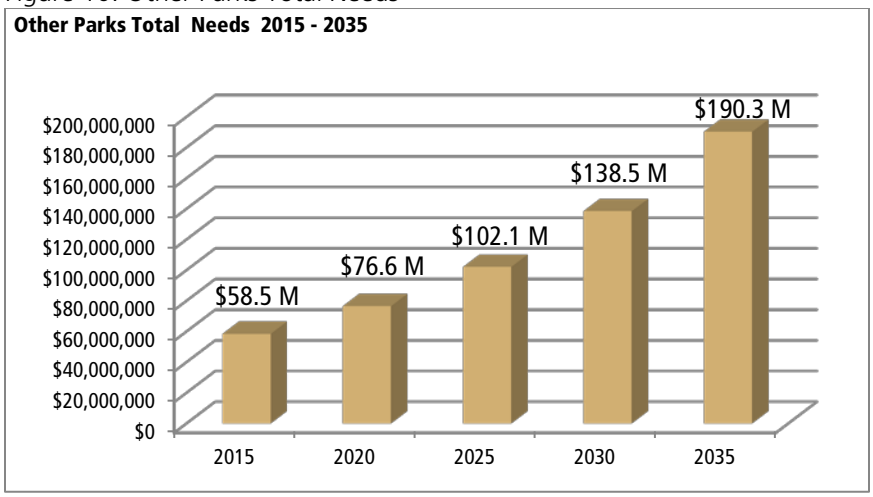
Figure 9. Focus Park Total Needs



OTHER PARKS

The total annual estimated needs for all Other Parks grow from $58 million in 2015 to $190 million in 2035. All dollars are in Year of Expenditure (YOE).

Figure 10. Other Parks Total Needs



TOTAL NEEDS BY WORK TYPE

Intermountain Region

Figure 11 shows the disaggregation of needs by work type in five-year increments from 2015 to 2035 for the Intermountain Region.

Figure 11. IMR Needs by Work Type 2015 – 2035

IMR Needs by Work Type 2015 - 2035					
Work Type	2015	2020	2025	2030	2035
Maintenance	$38,490,000	$27,400,000	$29,350,000	$32,130,000	$36,450,000
Component Renewal/Recapitalization	$158,890,000	$213,130,000	$287,440,000	$394,710,000	$563,210,000
Capital Improvement/New Construction	$3,180,000	$3,820,000	$4,070,000	$4,350,000	$4,670,000
Transit Operations	$15,364,000	$16,656,000	$18,494,000	$20,544,000	$22,794,000
Planning	$2,160,000	$2,330,000	$2,450,000	$2,580,000	$2,730,000
Total Need	$218,084,000	$269,216,000	$341,794,000	$454,304,000	$629,844,000

The table above shows the effect of under-investment in maintenance over time. As conditions deteriorate, regular and cyclic maintenance is not sufficient to bring pavement conditions back up to acceptable conditions, requiring more expensive heavy maintenance or reconstruction.

Figures 12 and 13 provide a graphic view of the proportional change from 2015 to 2035 in the disaggregation of needs by work type for the Intermountain Region.

Figure 12. IMR Needs by Work Type 2015

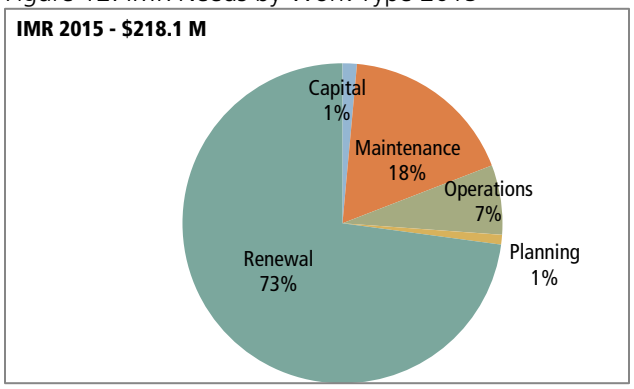
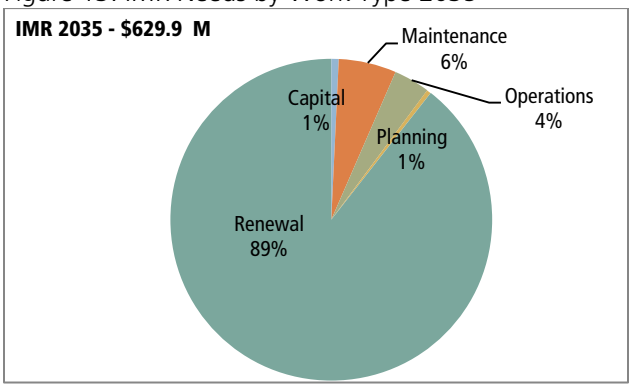


Figure 13. IMR Needs by Work Type 2035



Effects of the Pavement Lifecycle on Deferred Maintenance

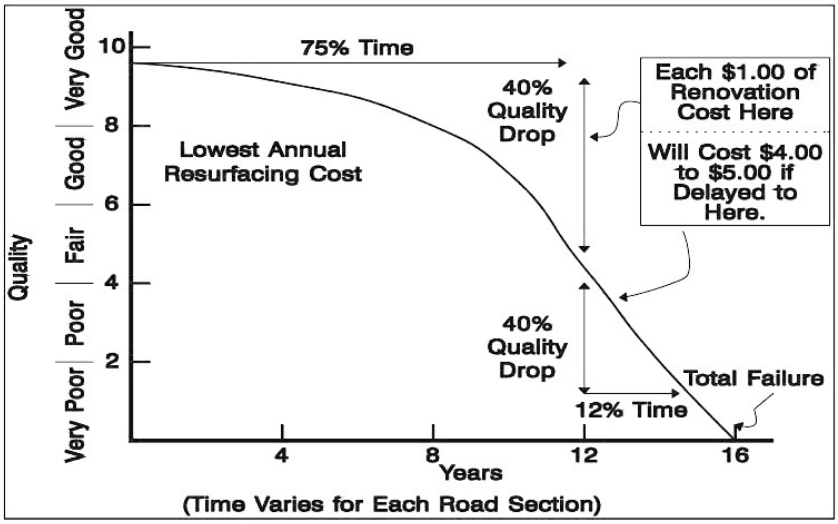
Currently programmed pavement treatments and rehabilitation portray a declining average Pavement Condition Rating (PCR) through at least 2016. See Figure 13. Recent information from FHWA indicates Cycle 4 estimates may overestimate baseline PCR by 8%-10%. This trend shows how currently programmed funds will not achieve the NPS goal of 85 PCR for all roadways and parking areas. Future projections of PCR beyond 2016 are not available at this time.

Figure 14. Change in Average Pavement Condition Rating 2011 – 2035

Change in Average PCR			
	2011	2016	Diff
Focus Parks	78.81	71.24	-7.57
Other Parks	79.08	70.28	-8.8
Yellowstone	73.82	70.54	-3.28
Total	77.83	70.67	-7.16

Figure 15 illustrates the effect of deferring pavement maintenance over time. As pavement maintenance projects are delayed or down-scoped to lower level maintenance than the optimum, requirements for future maintenance increase scope and cost. In effect, delaying appropriate maintenance will require future 3R or 4R projects to bring any roadway segment up to standard.

Figure 15. Pavement Life Cycle



PCR Changes for Roadway Asset Classes 2011 – 2016

Figure 16 illustrates the projected changes in PCR for all classifications to 2016 for Focus Parks, Yellowstone, Other Parks, and the Intermountain Region. PCR across all classifications is projected to fall significantly by 2016.

Figure 16. PCR Changes in Roadway Asset Classes 2011 – 2016

PCR Changes Across Roadway Asset Classes 2011 – 2016

	Treatment Estimate Costs Assets Not Included in Program			Lane Miles Not Treated in Program			Average PCR		
	2011 TIP	2016 TIP	Increase	Total Lane Miles	Untreated Lane Miles	Percent Untreated	2011 PCR	2016 PCR	Change in PCR
Focus Parks									
Class 1	$48,722,134	$57,303,184	17.6%	689.6	248.9	36.1%	85.83	80.03	-5.80
Class 2	$25,142,511	$31,037,061	23.4%	175.9	114.0	64.8%	75.94	67.06	-8.88
Class 3-8	$46,537,171	$60,688,660	30.4%	178.8	154.8	86.6%	59.16	49.29	-9.87
Public Parking	$23,578,612	$34,441,277	46.1%	193.5	172.2	89.0%	75.73	65.77	-9.96
Non-Public Parking	$5,926,523	$7,423,743	25.3%	36.2	35.0	96.7%	72.49	61.83	-10.66
FP TOTAL	$149,906,951	$190,893,925	27.3%	1274.0	724.9	56.9%	78.81	71.24	-7.57
Other Parks									
Class 1	$95,501,622	$130,703,377	36.9%	1022.6	508.3	49.7%	84.08	75.37	-8.71
Class 2	$15,678,640	$14,671,600	-6.4%	120.3	51.8	43.0%	80.32	70.23	-10.09
Class 3-8	$39,953,735	$49,325,851	23.5%	183.7	150.1	81.7%	64.35	55.10	-9.26
Public Parking	$39,351,168	$51,042,549	29.7%	269.0	248.4	92.4%	71.64	63.25	-8.39
Non-Public Parking	$6,198,501	$6,698,936	8.1%	29.3	28.8	98.3%	60.32	52.57	-7.75
Non FP TOTAL	$196,683,666	$252,442,312	28.3%	1624.8	987.4	60.8%	79.08	70.28	-8.80
Yellowstone									
Class 1	$23,891,864	$82,467,413	245.2%	583.2	137.8	23.6%	81.10	80.15	-0.95
Class 2	$7,492,250	$1,661,680	-77.8%	30.3	6.9	22.7%	44.69	36.57	-8.13
Class 3-8	$28,162,735	$29,277,258	4.0%	87.6	79.4	90.7%	43.67	34.39	-9.28
Parking	$23,632,596	$19,124,172	-19.1%	113.5	79.5	70.0%	67.47	58.12	-9.35
YELL TOTAL	$83,179,445	$132,530,523	59.3%	814.6	303.6	37.3%	73.82	70.54	-3.29
IMR TOTAL									
Class 1	$168,115,620	$270,473,974	60.9%	2295.4	895.0	39.0%	83.85	77.98	-5.86
Class 2	$48,313,401	$47,370,341	-2.0%	326.5	172.7	52.9%	74.65	65.40	-9.26
Class 3-8	$114,653,641	$139,291,769	21.5%	450.1	384.3	85.4%	58.27	48.76	-9.50
Parking	$98,687,400	$118,730,676	20.3%	641.5	563.9	87.9%	71.67	62.53	-9.13
IMR TOTAL	$429,770,062	$575,866,760	34.0%	3713.4	2015.9	54.3%	77.83	70.67	-7.17

Class 1 and 2 roadways (71% of all roadway miles) show a higher pavement condition rating as a result of current pavement management strategies that seek to maintain pavement at the most cost effective level, rather than the out of favor approach of addressing the worst sections first.

Highway Pavement Management Application costs in the table above, including Yellowstone, are included in the long range estimates for maintenance and component renewal/recapitalization region-wide.

Yellowstone National Park has been analyzed separately by the Federal Highway Administration in the Highway Pavement Management Application due to its dedicated allocation and funding appropriations. The analysis is included here to provide additional detail on major projects in Yellowstone. Despite the large funding amounts allocated to reconstruction of the main Yellowstone Loop Road over recent years, average PCR for the park continues to fall. This is attributed to the large size of the park's road system where maintenance has been deferred.

Pavement Maintenance Unit Costs

A summary of the treatment type breakdown of HPMA Maintenance and Rehabilitation costs is provided in Figure 17 below. The average costs were used by FHWA to forecast the costs of recommended projects, and therefore have been included in this Needs Assessment.

Figure 17. Average Net Construction Cost Per Mile

Average Net Construction Cost Per Mile		
IMR	2011-2015	2016-2020
Pavement Maintenance	$60,000	$70,000
Light 3R	$450,000	$471,000
Heavy 3R	$570,000	$591,000
4R	$1,131,000	$1,177,000

According to HPMA, $573.6 million worth of work, including pavement treatments, light 3R, heavy 3R and reconstruction (without realignment or widening) is needed in the IMR from 2016-2020. This includes all roads and parking, public and non-public.

Yellowstone Major Reconstruction Project

Yellowstone's road system is one of the oldest in the National Park Service. Construction began in the 1870s and the Grand Loop was completed in 1905. When the National Park Service took over the administration of the park in 1918, the agency began upgrading the road network to accommodate increasing visitation as well as the growing popularity of the new automobile. The last major reconstruction was completed in the early 1930s, with minor work completed during the Mission 66 era. The current surface width varies from 19-22 feet with no shoulders. The decision was made in the 1980s to reconstruct the road to a 30 foot total width, with 11 foot travel lanes and 4 foot shoulders, on all routes except where steep terrain would be too great an impact to resources. The primary objective is to increase the functionality of an old, deficient system to accommodate the increasing number and size of vehicles.

The project began in 1988 with an expected 20-year reconstruction program. Due to inadequate funding, only 135 miles of the 254 mile Grand Loop and Entrance Roads have been reconstructed to date. Much of the work completed so far is the least expensive. The remainder is challenging, with costly designs, construction techniques, and environmental mitigation contributing to escalating costs. Sections currently in design include Norris to Golden Gate, the North Entrance road, and the replacement of the structurally deficient Pelican Creek Bridge and associated fills that block water movement across a large fen wetland with a viaduct.

In 2006 the estimate of remaining costs to complete the Grand Loop and three of the park's five entrance roads was $640 million. That estimate has now inflated to $850 million, and may be significantly under actual costs. The project is currently allocated around $11 million per year, pointing to a very long schedule. Delays contribute to the growing costs; while the current estimate to complete the Norris to Golden Gate section alone is over $90 million, that cost may exceed $150 million by the time funds are available for construction. The most recent estimate for the replacement of the Pelican Creek Bridge and fill material with a viaduct is $40 million.

In the meantime, the entire remaining portion of the road network is in poor condition, but has been cloaked with continuous overlays that present a reasonable driving surface, but do not address the structural elements of the failing roadway.

These numerous overlays of asphalt have raised the road surface to a point that dangerous drop-offs exist at the pavement edge in many places along the corridor. Lack of attention by drivers due to sight-seeing and wildlife viewing contributes to many accidents as wheels drop off the edge of the pavement and drivers over correct. In addition, bicyclists are strongly discouraged from riding on the old sections of the Grand Loop and bicycle tours are not allowed on these narrow roads. With

nowhere to pull over, visitors stop their cars in the traffic lanes to view wildlife, creating massive animal jams and blocking access for emergency vehicles. Improved road sections such as wider lands, wider shoulders, and vehicle turnouts have reported reduced congestion and safety issues.

The entire estimated future cost (estimated at $850 million in 2013) for the Yellowstone reconstruction project has been included in the Component Renewal/Recapitalization work type for this needs assessment. The program was annualized to approximately $30 million per year to account for the Yellowstone construction season and the need to phase projects in order not to hinder park visitation. Annual allocations are currently not expected to significantly exceed $11 million per year, due to impacts on visitor experience during the brief construction season.

Bridge Maintenance Needs

Bridges are maintained at levels supported by the current budget. As a result, this future needs analysis assumes that bridge maintenance needs necessary to maintain bridges at condition C or D (Condition A and B are urgent needs) is contained within the forecast budget. There are only nine bridges currently at Condition B, with none at Condition A. All bridges in Condition B are currently in design and being prepared for rehabilitation in the near term. The difference between the presented URS estimated maintenance and the O&M (2%) estimate was assumed to be a future unmet need.

Figure 18. IMR Bridge and Tunnel Maintenance Needs

Bridge and Tunnel Maintenance Needs				
	CRV[1]	DM[2]	O&M (2%)[3]	URS Est. Maintenance[4]
2015	$310,700,000	$87,900,000	$6,210,000	$3,200,000
2035	$470,820,000	$133,200,000	$9,420,000	$4,900,000

[1] – from Baseline Conditions inflated at 2.1%
[2] – Pontis inflated at 2.1%
[3] – Method recognized by BAH (CRVx2%) inflated at 2.1%
[4] – Based on 5 year history of expenditures inflated at 2.1%

Focus Parks Need by Work Type

Figure 19 shows the disaggregation of needs by functional area in five-year increments from 2015 to 2035 for the Focus Parks, including $121.4 million for Yellowstone, alone.

Figure 19. Focus Parks Needs by Work Type

Focus Parks Needs by Work Type 2015 - 2035					
Work Type	2015	2020	2025	2030	2035
Maintenance	$24,260,000	$18,710,000	$20,010,000	$22,040,000	$25,300,000
Component Renewal/Recapitalization	$115,430,000	$149,850,000	$193,360,000	$265,070,000	$382,910,000
Capital Improvement/New Construction	$3,050,000	$3,610,000	$3,850,000	$4,120,000	$4,420,000
Transit Operations	$15,364,000	$16,656,000	$18,494,000	$20,544,000	$22,794,000
Planning	$1,500,000	$1,580,000	$1,670,000	$1,770,000	$1,880,000
Total Need	$159,604,000	$190,406,000	$237,384,000	$313,544,000	$437,304,000

Figures 20 and 21 provide a graphic view of the proportional change from 2015 to 2035 in the disaggregation of needs by work type for the Focus Parks. The effects of the pavement lifecycle and Deferred Maintenance are again illustrated with the Focus Parks. As roadways decline in condition, fewer low level pavement treatments can be applied. The shift from maintenance (15%) in 2015 to Renewal (85%) in 2035 is evident.

Figure 20. Focus Park Needs by Work Type 2015

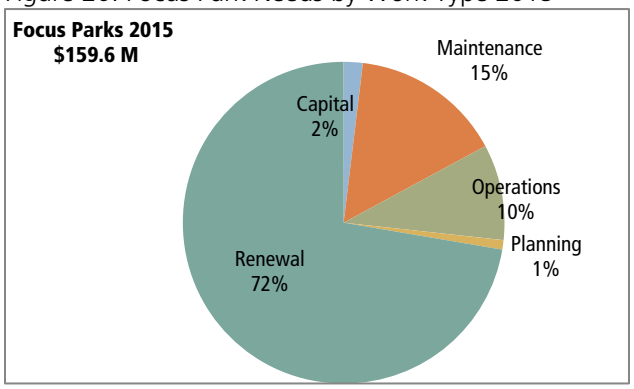
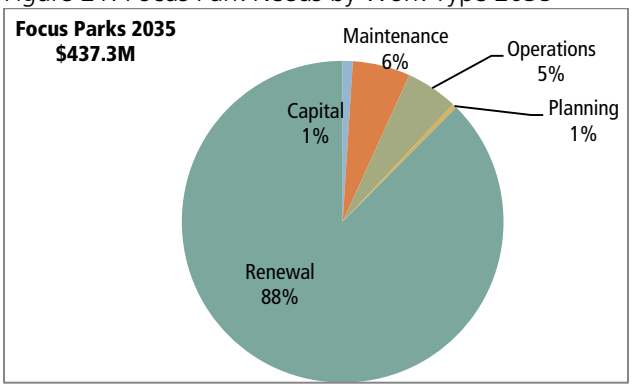


Figure 21. Focus Park Needs by Work Type 2035



Significant Projects in Years 6-12

This needs assessment includes costs for major projects in the focus parks in the near term (6-12 years) that have not yet been programmed. These potential projects document existent needs for improvements for which funding has not yet been identified. They represent a significant potential investment by the Intermountain Region in developing and maintaining the transportation system at the level required to meet its needs. A sample of these major projects is provided in Figure 22, below.

Figure 22. Significant Projects in Focus Parks in Years 6-12

Significant Projects in Focus Parks		
Park	Description	Estimated Cost
BRCA	Campground Road Reconstruction - North and Sunset (historic, cultural landscape,	$2,300,000
CHIC	Reconstruct Cold Springs Campground Roads	$3,300,000
GLAC	Reconstruct Avalanche and Fish Creek Campground Roads (historic, cultural landscape)	$3,900,000
GRCA	Reconstruct Village Loop Drive (historic, cultural landscape)	$5,000,000
GRTE	Reconstruct Colter Bay Area Roads and Parking Lots (historic, cultural landscape, natural resource)	$8,000,000
MEVE	Reconstruct Morefield Campground Roads (historic)	$3,650,000
ROMO	Reconstruct Moraine, Glacier Basin, Aspenglen Campground Roads	$5,600,000
SAAN	Rehabilitate all Parking Lots (historic)	$1,200,000
SAGU	Reconstruct Picture Rocks Road (historic)	$5,000,000
WHSA	Rehabilitate Dunes Drive (natural and cultural resource)	$2,600,000
YELL	Grand Loop Reconstruction (6 years @ $40 million/year) (historic, natural and cultural resource, cultural landscapes)	$240,000,000
ZION	Reconstruct Watchman and South Campground Roads (historic, cultural landscape)	$3,500,000

Alternative Transportation System Needs

This needs analysis includes all costs necessary to operate the six alternative transportation systems currently owned and operated by the National Parks Service. Future costs for capital and operational expenses were extracted from recently completed proforma and shown in the table below. Capital costs include fleet replacement on the schedule recommended in the five completed transit proforma.

Figure 23. ATS Capital and Operations Needs by Park

ATS Capital and Operations Needs by Park									
	2009			2010			2011		
Park	Ops	Cap	Tot	Ops	Cap	Tot	Ops	Cap	Tot
BRCA	-	-	$-	$1,148,201	-	$1,148,201	$1,127,943	$103,900	$1,231,843
GLAC	-	$0	$-	$824,771	$0	$824,771	$798,084	$0	$798,084
GRCA	-	$2,999,283	$2,999,283	$6,130,635	$3,040,758	$9,171,393	$6,368,699	$3,177,514	$9,546,213
MEVE *	-	-	$-	$62,000	-	$62,000	$63,000	-	$63,000
ROMO	-	$0	$-	$1,696,206	$0	$1,696,206	$1,706,251	$0	$1,706,251
ZION	-	$2,321,551	$2,321,551	$2,937,654	$1,311,239	$4,248,893	$3,048,373	$0	$3,048,373
Total Cost	$-	$5,320,834	$5,320,834	$12,799,467	$4,351,997	$17,151,464	$13,112,350	$3,281,414	$16,393,764
	2012			2013			2014		
Park	Ops	Cap	Tot	Ops	Cap	Tot	Ops	Cap	Tot
BRCA	$1,155,354	-	$1,155,354	$1,184,955	-	$1,184,955	$1,205,525	-	$1,205,525
GLAC	$826,521	$0	$826,521	$856,280	$3,110,000	$3,966,280	$887,438	$3,080,000	$3,967,438
GRCA	$6,700,916	$3,397,432	$10,098,348	$6,868,399	$3,550,143	$10,418,542	$7,100,009	$3,809,157	$10,909,166
MEVE *	$64,000	-	$64,000	$65,000	-	$65,000	$66,000	-	$66,000
ROMO	$1,716,590	$0	$1,716,590	$1,727,230	$0	$1,727,230	$1,738,180	$0	$1,738,180
ZION	$3,167,009	$0	$3,167,009	$3,294,548	$1,216,800	$4,511,348	$3,432,122	$1,265,471	$4,697,593
Total Cost	$13,630,390	$3,397,432	$17,027,822	$13,996,412	$7,876,943	$21,873,355	$14,429,274	$8,154,628	$22,583,902

* MEVE does not generate a pro forma document. Financial data comparable to a pro forma was provided for the tram operation.

Costs beyond 2014 were forecast based on the proforma by extending at the rate of inflation. One cycle of fleet replacement (twenty-year life cycle) for each system is included in the estimated future costs as an annualized amount.

Figure 24. Total ATS Capital and Operations Need 2015 – 2035 (Chart)

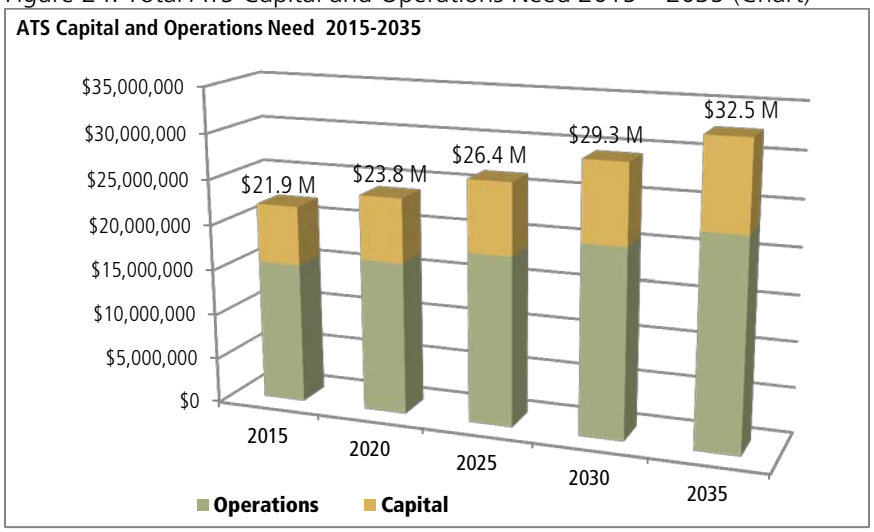


Figure 25. Total ATS Capital and Operations Need 2015 – 2035 (Table)

Total ATS Capital and Operations Need 2015-2035					
	2015	2020	2025	2030	2035
Operations	$15,458,034	$16,752,000	$18,590,000	$20,640,000	$22,890,000
Capital	$6,490,000	$7,040,000	$7,810,000	$8,670,000	$9,610,000
Total	$21,948,034	$23,792,000	$26,400,000	$29,310,000	$32,500,000

Other Parks Needs by Work Type

Figure 26 shows the disaggregation of needs by work type in five-year increments from 2015 to 2035 for the Other Parks.

Figure 26. Other Parks Needs by Work Type 2015 - 2035 (Table)

Other Parks Needs by Work Type 2015 - 2035					
Work Type	2015	2020	2025	2030	2035
Maintenance	$14,230,000	$8,690,000	$9,340,000	$10,090,000	$11,150,000
Component Renewal/Recapitalization	$43,460,000	$63,280,000	$94,080,000	$129,640,000	$180,300,000
Capital Improvement/New Construction	$130,000	$210,000	$220,000	$230,000	$250,000
Transit Operations*	$0	$0	$0	$0	$0
Planning	$660,000	$750,000	$780,000	$810,000	$850,000
Total Need	$58,480,000	$78,810,000	$104,410,000	$140,760,000	$192,540,000

* Transit Operations in Other Parks is shown as $0 since there are no NPS-owned and operated transit systems outside focus parks.

Figures 27 and 28 provide a graphic view of the proportional change from 2015 to 2035 in the disaggregation of needs by work type for the Other Parks. The same situation applies to the shift from Maintenance to Component Renewal/Recapitalization in Other Parks as was evident at the Regional and aggregate Focus Park level.

Figure 27. Other Parks Needs by Work Type 2015

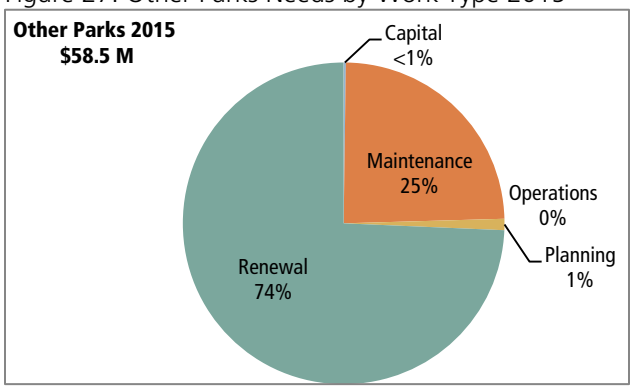
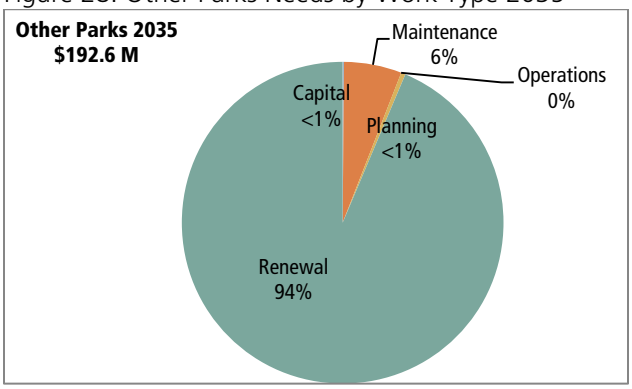


Figure 28. Other Parks Needs by Work Type 2035



OTHER UNMET NEEDS

Important segments of the long range transportation plan goal areas may not be fully represented in current needs, as documented in historic obligations and funding, formulated needs in the Federal Lands Highway Program, or unformulated needs in existing PMIS statements, making cost estimates for these items difficult to extract. These items are often included within other projects, especially if asset–related.

Examples of under-represented needs include efforts to address climate change, sustainability, future maintenance costs for as yet un-built capital projects, transit operating costs, enhancing the visitor experience, public outreach and coordination with regional transportation agencies, changes in communication technology, data collection efforts for performance measures, etc.

Additional unmet needs include:

- Planning
- Visitor Experience
- Resource Protection
- ADA/ABA Compliance
- Sidewalks, Curb, Gutter
- Historic Roads & Bridges
- Cost of Asset Decommission & Restoration

For the purpose of this needs assessment, such needs are assumed to represent additional quantifiable future unmet/unidentified needs and are constant over time (+ inflation) as applied to total needs. Total costs for transportation do include these needs in an aggregate manner.

Illustrative Projects in Focus Parks to Address Other Unmet Needs

As part of the needs assessment, existing planning documents were examined to help identify a representative sample of needs that address the full range goals. Documents examined for this report include General Management Plans (GMP), Park Asset Management Plans (PAMP), various transportation studies, strategic plans, and master plans. While many of these reports are aged, and some needs have been addressed in the intervening period, it is likely that similar needs still exist in IMR parks. These project types and needs are not consistently documented in available resources. It is likely that needs of these types are frequently brought up at the planning level, but given the realities of constrained budgets, may fall by the wayside during programming phases. Figure 29 is a representative sample of discussions recorded in the documents.

Figure 29. Illustrative Projects in Focus Parks to Address Other Unmet Needs

Park	Issue/Project Type	Source	LRTP Goal
BRCA	Installation and operation of Intelligent Transportation System (ITS) for traffic and parking management.	Multimodal transportation Plan 2013	Mobility Access, and Connectivity
CHIC	Dust abatement program, including standard dust abatement measures such as: watering or otherwise stabilizing soils, covering haul trucks, employing speed limits on unpaved roads, minimizing vegetation clearing, and re-vegetating after construction.	General Management Plan 2008	Resource Protection
GLAC	Conduct additional engineering, economic, cultural resource, and environmental studies on the comprehensive reconstruction of the Going-to-the Sun Road. Grey wolves face potential impacts and further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road.	General Management Plan 1999	Resource Protection
GRCA	Wayfinding is deficient in several areas making it difficult to communicate key locations and transportation options to visitors.	South Rim Visitor Transportation Plan, 2008	Visitor Experience
GRTE	The number of visitor accident/incidents will be at or below 4,969 accidents/incidents. Grand Teton National Park will identify correctable incident types and increase information and visitor awareness on safety issues. The park will implement the SMIS reporting system. It will maintain safe roads, trails, buildings and utilities to minimize visitor incident/accidents.	Strategic Plan 2005	Mobility, Access, and Connectivity
MEVE	Information prior to visiting park is minimal, orientation at or within the park is minimal, visitors are confused about park rules, restrictions, and how to experience park	Visitor Distribution and Transportation Study (2004)	Visitor Experience
ROMO	Parking is perhaps the biggest transportation concern causing safety and resource protection impacts (parking on tundra) (p.23) particularly at Alpine Visitor Center, Bear Lake, Lawn Lake, and the vista parking lots on Trail Ridge Road (p.12).Concerning these congestion issues, buses are a small percentage of the vehicle traffic focusing the issue on personal vehicles.(p.17) Proper managed dispersal of visitors and encouraging multi-modal transportation options will help alleviate concerns.	Transportation Plan 2000	Mobility, Access, and Connectivity
SAAN	"If it becomes apparent that there will be crowding or resource impairment problems in the future, the park will conduct a visitor experience and resource protection study to determine the numerical limits or administrative controls that are needed."	GMP 1999	Visitor Experience & Resource Protection
SAGU	"Resource management issues in relation to increasing visitor use involve fragmentation and isolation of park habitats, protection of wildlife, and impacts on cultural resources." (p.3)	GMP/EIS (2008)	Resource Protection
WHSA	"Construction of roads and visitor facilities will leave scars and have a visual impact."	GMP/EIS	Resource Protection
YELL	Protocol for the unloading and parking of buses needs to be addressed for safety concerns.	Old Faithful Transportation/ Circulation - ES (2003)	Mobility, Access, and Connectivity & Visitor Experience
ZION	"Use of green energy sources and automation methods to reduce operations costs, e.g., building automation systems. Although not reflected in the PAMP, Zion will reduce the park's vehicle fleet and add hybrids."	PAMP 2009	Sustainable Operations

Transportation Program Needs

Bridge

Through the course of this study, it was determined that the Intermountain Region Transportation Program has a need for additional staffing to provide ongoing analysis and management of bridge maintenance. Many bridges are either nearing the end of design life, or require maintenance in the near future. The rates of deterioration for aging structures is unknown, making long range cost projections somewhat unreliable. To meet this need, costs for 0.5 FTE have been added to unmet needs.

Congestion Management

Through the course of this study, it was determined that the Intermountain Region Transportation Program has a need for additional staffing to develop and maintain a congestion management system at the regional level. A number of congestion management strategies have been brought forward during the planning process which promise to help relieve the problem. Strategies might include parking management, visitor distribution, Intelligent Transportation Systems, visitor information systems, capacity improvements, implementation or expansion of ATS, and others. The new position would guide research and development of best management practices, as well as implementation policies and assistance to parks with significant congestion processes.

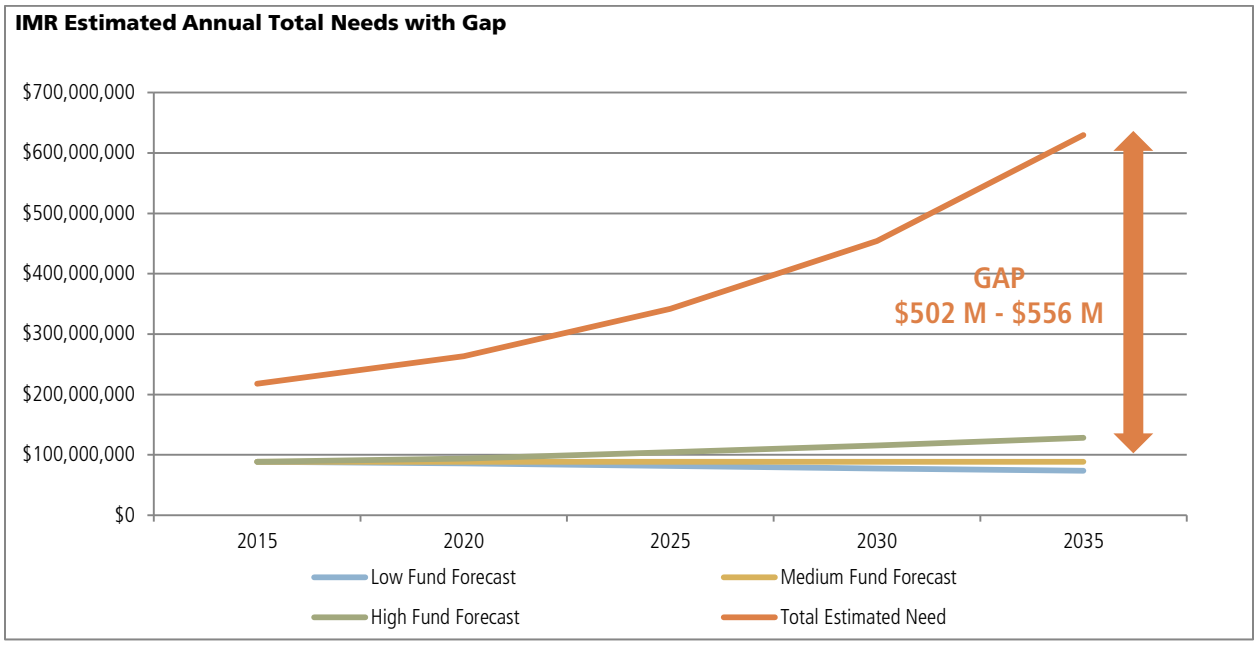
UNMET NEEDS: THE GAP BETWEEN FUNDING AND COSTS

This section examines the projected funding forecast documented in the *Financial Analysis Technical Report* compared to estimated needs.

INTERMOUNTAIN REGION GAP

The total gap between projected funding and estimated needs for the Intermountain Region grows to $502 million to $556 million (annually) by 2035, depending on the funding trend line. See Figure 30.

Figure 30. IMR Estimated Annual Total Needs with Gap (Chart)



IMR Estimated Annual Total Needs with Gap					
	2015	2020	2025	2030	2035
Low Funding Forecast	$88,290,000	$85,670,000	$81,470,000	$77,480,000	$73,690,000
Medium Funding Forecast	$88,290,000	$88,290,000	$88,290,000	$88,290,000	$88,290,000
High Funding Forecast	$88,290,000	$93,960,000	$104,240,000	$115,660,000	$128,330,000
Total Estimated Need	$218,084,000	$269,216,000	$341,794,000	$454,304,000	$629,844,000
Total Gap Low Forecast	$129,794,000	$183,546,000	$260,324,000	$376,824,000	$556,154,000
Total Gap High Forecast	$129,794,000	$175,256,000	$237,554,000	$338,644,000	$501,514,000

Significantly, selection of a High, Medium, or Low Funding forecast is of little consequence in reducing the large gap between identified funding and identified needs. The overwhelming large deficit (78% of total needs) in the component renewal work type resulting from deferred maintenance, and especially from pavement deferred maintenance, makes it unlikely that the gap can be reduced in a significant way without reducing the pavement maintenance backlog by either directing more of the available funds to pavement maintenance, identifying new or additional future funds, or both.

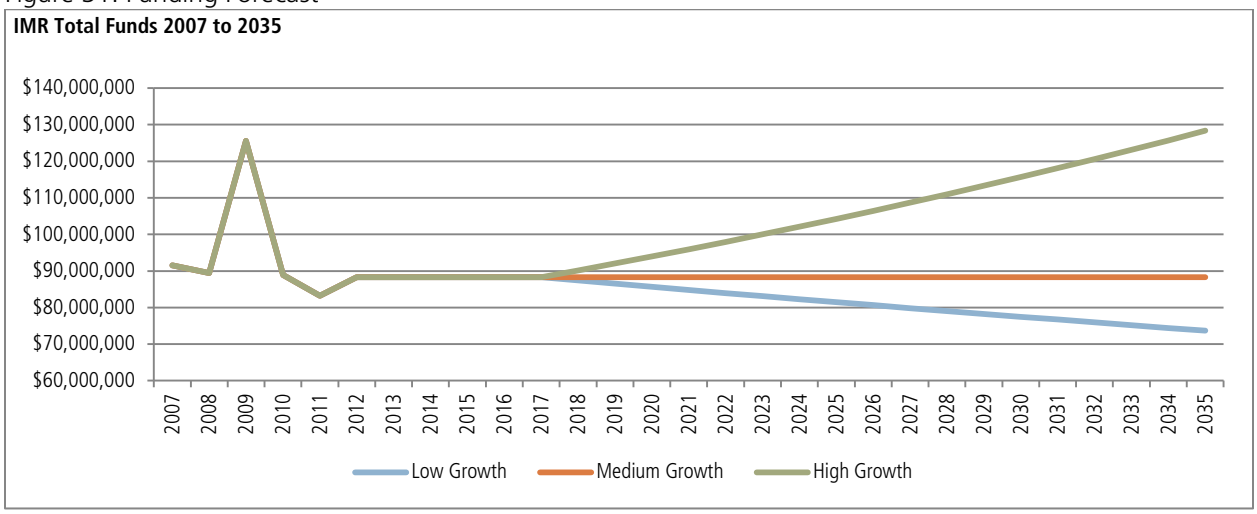
Selection of High Fund Forecast

As described in the *Financial Analysis Technical Report*, three potential future funding trends were examined. These potential trends included:

- Low Fund Forecast – decrease in future funding at annual rate of 1.0%.
- Medium Fund Forecast – No change in future funding, or 0.0% growth.
- High Fund Forecast – An increase in funding at the rate of inflation, or 2.1%.

The high forecast was chosen as the most likely over the long term. Note that this conservative estimate at the rate of inflation does not produce additional purchasing power in the future, but simply keeps pace with existing funds. The growth in future funds was applied to the funding stream beginning in the year 2017, assuming that the current program is funded and no changes will occur until that time. Figure 31, below, illustrates the point at which inflation was applied.

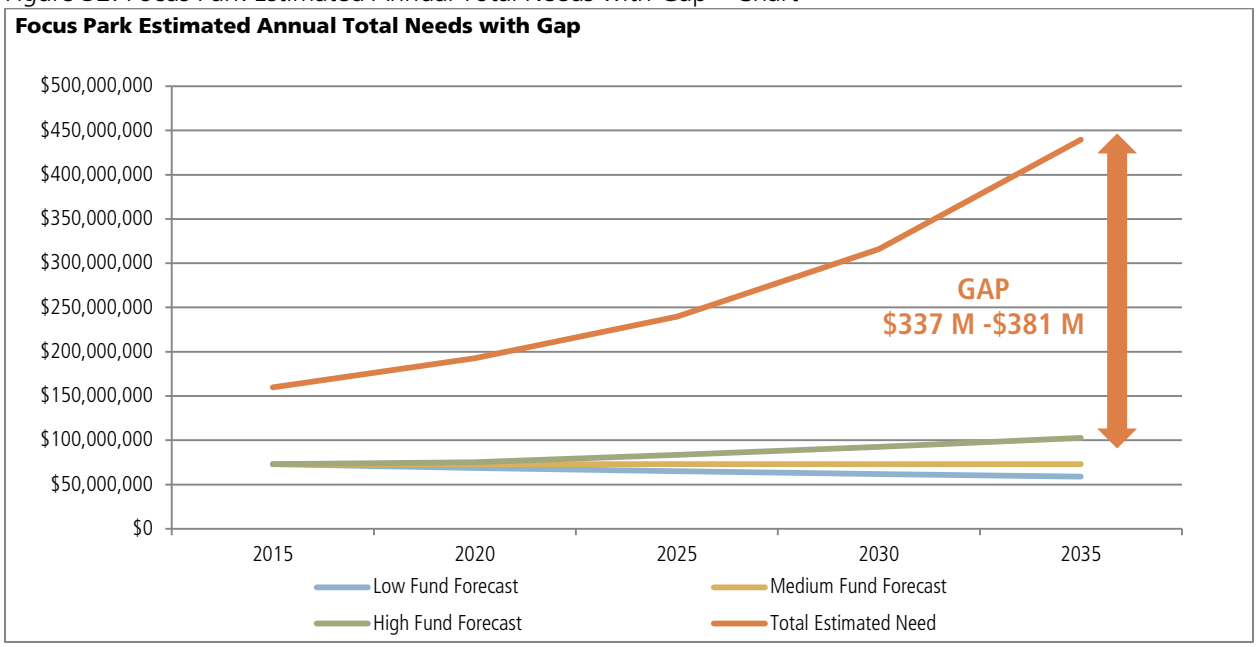
Figure 31. Funding Forecast



FOCUS PARK GAP

The total gap between projected funding and estimated needs for the Focus Parks grows to $337 million to $381 million (annually) by 2035, depending on the funding trend line. See Figure 32.

Figure 32. Focus Park Estimated Annual Total Needs with Gap – Chart

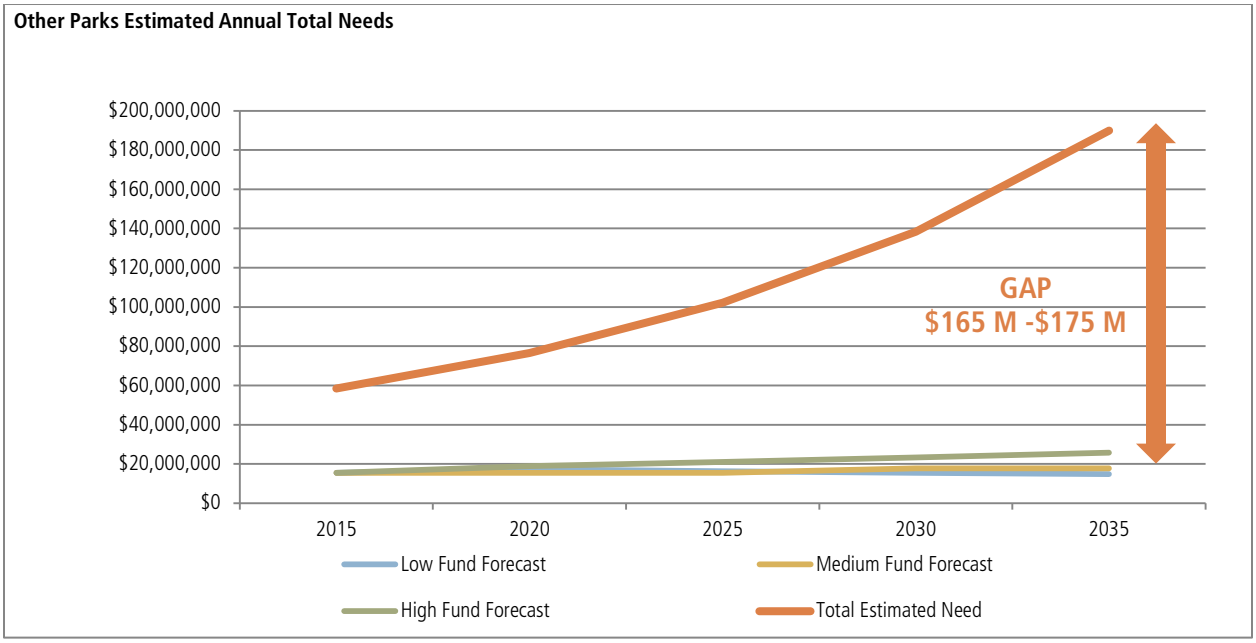


Focus Park Estimated Annual Total Needs with Gap					
	2015	2020	2025	2030	2035
Low Funding Forecast	$72,900,000	$68,480,000	$65,140,000	$61,950,000	$58,910,000
Medium Funding Forecast	$72,900,000	$72,900,000	$72,900,000	$72,900,000	$72,900,000
High Funding Forecast	$72,900,000	$75,100,000	$83,330,000	$92,470,000	$102,610,000
Total Estimated Need	$159,604,000	$192,676,000	$239,654,000	$315,814,000	$439,574,000
Total Gap Low Forecast	$86,704,000	$124,196,000	$174,514,000	$253,864,000	$380,664,000
Total Gap High Forecast	$86,704,000	$117,576,000	$156,324,000	$223,344,000	$336,964,000

OTHER PARKS GAP

The total gap between projected funding and estimated needs for the Other Parks grows to $165 million to $175 million (annually) by 2035, depending on the funding trend line. See Figure 33.

Figure 33. Other Parks Estimated Annual Total Needs with Gap – Chart



Other Parks Estimated Annual Total Needs with Gap					
	2015	2020	2025	2030	2035
Low Funding Forecast	$15,390,000	$17,190,000	$16,330,000	$15,530,000	$14,780,000
Medium Funding Forecast	$15,390,000	$15,390,000	$15,390,000	$15,390,000	$15,390,000
High Funding Forecast	$15,390,000	$18,860,000	$20,910,000	$23,190,000	$25,720,000
Total Estimated Need	$58,470,000	$76,530,000	$102,130,000	$138,480,000	$190,260,000
Total Gap Low Forecast	$43,080,000	$59,340,000	$85,800,000	$122,950,000	$175,480,000
Total Gap High Forecast	$43,080,000	$57,670,000	$81,220,000	$115,290,000	$164,540,000

TOTAL NEEDS AND GAP BY WORK TYPE IN 2035

Figure 34. Total Needs and Gap by Work Type in 2035

Total Needs and Gap by Work Type in 2035			
IMR TOTAL	2035	2035 Funding Forecast (High)	2035 GAP
Maintenance	$36,450,000	$39,860,000	-$3,410,000*
Component Renewal/Recapitalization	$563,210,000	$70,030,000	$493,180,000
Capital Improvements/New Construction	$4,670,000	$2,170,000	$2,500,000
Transit Operations	$22,794,000	$14,500,000	$8,294,000
Planning	$2,730,000	$1,770,000	$960,000
TOTAL NEED	$629,844,000	$128,330,000	$501,514,000
FOCUS PARKS			
Maintenance	$25,300,000	$28,880,000	-$3,580,000
Component Renewal/Recapitalization	$382,910,000	$56,150,000	$326,760,000
Capital Improvements/New Construction	$4,420,000	$2,040,000	$2,380,000
Transit Operations	$22,794,000	$14,500,000	$8,294,000
Planning	$1,880,000	$1,090,000	$790,000
TOTAL NEED	$437,304,000	$102,660,000	$334,644,000
NON FOCUS PARKS			
Maintenance	$11,150,000	$10,980,000	$170,000
Component Renewal/Recapitalization	$180,300,000	$13,880,000	$166,420,000
Capital Improvements/New Construction	$250,000	$130,000	$120,000
Transit Operations	$0	$0	$0
Planning	$850,000	$680,000	$170,000
TOTAL NEED	$192,540,000	$25,670,000	$166,870,000

* The Maintenance gap appears as a negative number in 2035 and is based on HMPA forecasts for pavement treatments. As conditions deteriorate over time and maintenance is deferred, the needs transfer to component renewal/recapitalization. The negative number does not mean that there is no more maintenance to complete, but that the maintenance will be less effective, and may be more appropriate to use on renewal projects.

NEXT STEPS: MAPPING WORK TYPES TO LRTP GOALS

This report documents needs by work type as tracked in NPS financial databases and projected to 2035. The long range plan is constructed around the framework of goals developed early in the process. The plan will assign strategies and funding at a program level to each of the five goals in two action planning scenarios that address the needs documented in this report. URS developed a draft matrix to assist the transition to a goals-based plan as shown in Figure 35.

The Core Team will evaluate the matrix for further development at a future workshop. It is anticipated that this matrix will provide the basis for a more specific index that allows the assignment of the level of benefit from each work type to each goal. The final product will inform us how well each future planning scenario affects the achievement of each goal compared to the baseline condition.

Figure 35. Mapping Financial and Needs Work Types to LRTP Goal Areas

Work Type	Planning Goal Area	Work Types Impact on Goal Area
Capital Improvements/ New Construction	Asset Management (Least Benefit)	The construction of capital improvements adds more assets to the IMR portfolio, increasing total cost of ownership. As a result, the work group has a negative impact to the goal area.
	Mobility, Access and Connectivity (Most Benefit)	Capital improvements allow parks to provide additional connectivity for all modes of transportation, removing current transportation and access barriers.
	Visitor Experience	Capital improvements have the ability to reduce congestion and improve visitor information systems.
	Resource Protection	Depending on the scope and magnitude of a capital improvement project, recourses within the park may be damaged, negatively impacting resource protection.
	Sustainable Operations	Capital improvements may introduce sustainable technology to the park, however the new technology often comes with additional maintenance requirements, limiting the financial sustainability of the improvement.
Maintenance	Asset Management (Most Benefit)	Maintenance invests financial resources in existing infrastructure and assets preserving existing investments.
	Mobility, Access and Connectivity (Least Benefit)	Maintenance of existing facilities does not improve connectivity within parks and has minimal impact on reducing use of personal vehicles. Some maintenance projects may improve safety at select locations.
	Visitor Experience	Maintenance may enhance the quality of the visitor experience; however, it typically does not reduce congestion or integrate visitor information systems.
	Resource Protection	Maintenance protects resources by maintaining the current infrastructure footprint and may also provide for the removal of redundant assets. However, maintenance does not have a direct positive benefit to resources, with the exception of historic transportation resources.
	Sustainable Operations	Maintenance activities can utilize state of the art techniques to improve facility sustainability. Context sensitive maintenance can be used to promote energy and resource conservation.
Transit Operations	Asset Management (Least Benefit)	Transit operations have a limited benefit on asset management. In some cases as transit operation costs increase, resources may need to be diverted from asset management programs. In addition, new transit service introduces new transit specific assets that must be maintained.
	Mobility, Access and Connectivity (Most Benefit)	Transit operations improve intermodal connections to and within parks. Transit also helps to reduce dependence on personal vehicles for transportation with parks. Availability and accessibility are also improved.
	Visitor Experience	Transit operations help to reduce congestion in localized areas and can implement visitor information systems. However, localized pedestrian congestion/overcrowding is experienced at some transit stops. Transit facilities can be designed to enhance the visitor experience, including visitor information.
	Resource Protection	Localized damage to resources has been observed near transit stops where large volumes of visitors disperse in a short period of time. Transit operations may lessen impacts on air quality, by reducing total emissions, and through the use of alternative fuels. Transit facilities can also be designed and constructed using technology that reduces resource impacts. Transit operations may also create the ability to remove unused and redundant infrastructure assets.
	Sustainable Operations	Sustainable practices can be utilized in the planning and operation of transit systems. However, the ever increasing cost of transit operation reduces the future sustainability of most existing transit systems.

Work Type	Planning Goal Area	Work Types Impact on Goal Area
Planning	Asset Management (Least Benefit)	Planning applications can be used to best prioritize asset management strategies across the region. Planning efforts can also collect, manage, and maintain data to support performance measurement.
	Mobility, Access and Connectivity (Most Benefit)	A primary focus of planning efforts is to improve connections and mobility within and to parks. Planning efforts focus on improving the efficiency of the transportation system within parks.
	Visitor Experience	Planning can be used to address all objectives of the Visitor Experience goal. However, additional investment is typically needed in other areas in order to fully benefit visitor experience.
	Resource Protection	Planning applications can be used to address all objectives of the Resource Protection goal, however in some cases the planning process may result in the construction of new assets that impact park resources. The combination of transportation and resource carrying capacity may help balance impacts.
	Sustainable Operations	The planning process can be used to strengthen regional and community relationships as well as develop sustainable and context sensitive solutions that promote energy and resource conservation. Planning applications have the flexibility to address sustainability issues in economic, social, and environmental fields.
Component Renewal/ Recapitalization	Asset Management (Most Benefit)	The focus of component renewal/recapitalization is the efficient management of existing assets in the IMR portfolio.
	Mobility, Access and Connectivity (Least Benefit)	Component renewal does not emphasize the construction of new facilities to address missing connectivity or intermodal access. High accident locations can be addressed through recapitalization efforts. However, the transportation footprint is typically unchanged.
	Visitor Experience	Component renewal may improve the quality of visitor experience by providing localized asset quality improvements. However, this work typically does not expand the transportation network footprint in a way that reduces congestion or introduces new services.
	Resource Protection	Resources are protected when the transportation infrastructure footprint is maintained and not expanded. Major construction projects must be carefully managed to avoid resource impacts in sensitive environmental areas. Recapitalization also replaces fleets on an efficient timeframe, promoting the benefits of transit services.
	Sustainable Operations	The goal of component renewal is to develop a sustainable strategy of maintaining the existing transportation infrastructure in the most efficient way. The current needs (deferred maintenance) of the transportation system in comparison to available funding reduce the ability to develop a sustainable program.

DATA AND INFORMATION GAPS

The IMR LRTP is considering a broad range of potential needs, many of which cannot be documented from the record. The following data and information gaps have been identified. Refined information in the following areas will assist future updates of the long range transportation plan:

- **Standards/Performance Measures**. The National Park Service has well-established performance targets for pavement condition (PCR>85 for all facilities) and bridge condition (C/D is acceptable, A/B is failing). The pavement condition target should, at a minimum, be re-examined to determine whether this goal is appropriate, given current DM, and whether it might be appropriate to establish a "tiered system" of pavement performance targets, depending on the use and type of facility. These targets and others should be set at the national level. Established targets will better enable planners to estimate costs to meet targets.

- **Bridges**. Current output from the bridge management system does not correlate condition to recommended improvement types. The scope and extent of work required to bring any given bridge to Condition C/D is not identified in Pontis. At this time, we are only able to calculate the cost of bridge improvements required for current conditions. The data does not allow an accurate forecast of future conditions or costs.

- **Intelligent Transportation Systems (ITS)**. Several parks explored and/or stated the need for advanced systems to monitor and manage traffic and parking. Arches National Park is actively engaged in studying and upgrading its systems. However, up to date information regarding the costs of implementation, including both infrastructure and operational aspects, for suitable technologies is not readily available. The acquisition of quantifiable ITS costs and benefits will assist accurate estimates of future needs.

- **Transportation Demand Management (TDM)**. Other operational needs such as TDM are often noted. The associated costs and potential effectiveness are not well documented and difficult to assess on a regional scale.

- **Vehicle Crashes and Safety Costs.** A 2009 study by CH2M Hill summarizes crash histories for select IMR park units. The report notes that data consistency across the region is a major data gap. While certain parks have documented crashes by type, and sometimes by road segment, other aspects are incomplete or missing entirely. Documentation of all crashes, with type, location, severity, injuries/fatalities, and other contributing factors, should be standard across the NPS. Crash locations should be incorporated in the reporting to facilitate GIS analysis and establishing the relationship of crashes to other conditions. Safety improvements have not been prioritized or costs quantified for the region. A Road Safety Audit was recently completed for YELL and BIBE and could serve as a template for the remainder of the region.

- **Transportation Assets other than Road/Bridge.** Future needs for transportation assets other than road and bridge, and to some extent ATS, are not well documented. For the purpose of this LRTP, historic expenditures for maintenance and for new capital projects were assumed to represent future needs by extension (at the regional level) and by inflating

costs at 2.1%. The level of confidence that this method is inclusive of all future park-specific needs is low, but considered adequate in the pilot plan, especially when compared to the more expensive asset-related costs for major infrastructure such as roads and bridges. Future plans should attempt to better capture such needs.

- **Secondary Effects of ATS.** Multiple park units have stated at least the desire, if not the need for the implementation or expansion of transit services. At the same time, park managers with operating systems often observe unintended effects of transit (in addition to high costs), such as pulsing of visitors at busy or environmentally fragile locations, social trailing on unhardened sites near transit stops, unacceptable impacts to visitor experience due to long wait times, noise, emissions, and other impacts. The trade-offs between these unintended effects and their benefits to transportation or visitation are not well-documented. More complete study of this subject would assist parks in determining actual need.

- **Unmet Needs for Planning, VE, Resource Protection, ADA/ABA Compliance, Historic Roads & Bridges, Cost of Asset Decommission & Restoration.** Additional work to document and compile specific park needs on a regional basis in these categories in future plans will help solidify the understanding of long term costs.

APPENDIX

NEEDS ESTIMATION METHODS AND ASSUMPTIONS

The estimation of transportation needs was based on a combination of methods to estimate both budgeted and unmet needs. This method was used to take into account needs that are met by the current programming and budgeting practices as well as to estimate needs that current practices are not able to meet. Needs were calculated for the predominant assets and activities within the region, recognizing the few items that were forecast represent a great majority of the region's needs, but not all needs.

In order to estimate needs met by programing practices and the additional unmet needs, a baseline of funding for the region was chosen as the base to represent the portion of forecast needs met by current practices. The zero percent (middle) funding forecast was chosen as the base of the needs forecasts. The chosen budget was assumed to include adequate funding to meet the needs of the HPMA constrained treatment scenario, bridge and tunnel maintenance at C and D ratings, current ATS operations of the six major systems, on-going park-level transportation operations and maintenance and the current level of Capital Improvement projects. The base funding forecast was not assumed to include roadway recapitalization in Yellowstone or significant bridge or tunnel replacement projects.

Current funding and programming practices are unable to meet all identified needs within the region. As a result, a second tier of needs was forecast to account for those needs that current practices are not able to meet. These forecasts were conducted at the asset level. The table below outlines the sources used to forecast unmet needs.

Asset Type/Program	Source/Assumption
Roadways and Parking	IMR and Yellowstone HPMA Forecasts Existing infrastructure maintained
Bridges and Tunnels	PONTIS, Cycle 3 FMSS CRV and DM Existing infrastructure maintained
Alternative Transportation Systems	ATS Pro forma, No new ATS systems, Existing system operations
Yellowstone Recapitalization	$850 Million Remaining in Program Maximum of $30 Million per year
Planning	$1 Million in excess planning needs per year based on existing planning needs
Capital Improvements	No unmet Capital Improvements assumed
Unknown Future Needs	Not calculated with an explicit value, but identified as an unknown need on top of forecast total needs.

This section provides a brief summary of the methodology used for each asset type/program. For more specific information and data, refer to the body of the Needs Assessment report.

Roadways and Parking

Forecast unmet roadway and parking needs were calculated using the HPMA forecasts developed by FHWA for the IMR and Yellowstone. The forecasts estimate a near term (through 2016 year) and medium term (through 2021) pavement treatment for each roadway and parking asset in the region. The forecasts also present an estimate cost for the treatment. Only a portion of the assets however get treatment under the constrained conditions of the current pavement management program. As a result, the unmet roadway and parking needs were identified as assets that were not treated in either forecast period. The lack of treatment in either period takes into account the projected deterioration of untreated assets. As a result, in many cases the medium term pavement treatment is forecast to be a more intensive treatment.

The estimated costs for 4R, H3R and L3R treatments were assumed to be representative of unmet component renewal/recapitalization needs. The total estimate costs for the 2016 and 2021 time frames were linearly extrapolated to 2031. The 2031 forecast was then increased by 2.1 percent per year to account for inflation.

The estimated costs for PM treatments were assumed to be representative of unmet maintenance needs. These total costs were also linearly extrapolated to 2031 and adjusted for inflation.

The calculations were conducted separately for focus parks, other parks and Yellowstone with assets grouped by roadway classification so that more detailed information could be provided as necessary to pinpoint where the most future unmet need was being generated by the current pavement management strategy.

The HPMA data was also used to calculate average PCR estimates for each group of assets as well to identify the current trend of change in pavement condition based on pavement management practices.

Bridges and Tunnels

Cycle 3 FMSS was used to calculate the current replacement value (CRV) of all bridge and tunnel assets in the region. The CRV value was adjusted for inflation to 2015, 2020, 2025, 2030 and 2035. The 2012 fourth quarter PONTIS report was used to calculate the total current deferred maintenance (DM) on the same assets. The DM was assumed to be the maximum amount of unmet need for these assets; however it is recognized that only a portion of this need is required to be met on an annual basis to maintain structurally sufficient bridges and structures.

Operations and maintenance needs were assumed to be the total minimum annual need necessary to maintain bridge and tunnel assets. The method recognized by Booze Allen Hall estimates O&M needs as 2 percent of the CRV. The difference between this calculation and the current amount of bridge and tunnel funding in the transportation program was assumed to be the unmet need for bridges and tunnels.

Alternative Transportation Systems

The pro forma models for Bryce Canyon (BRCA), Glacier (GLAC), Grand Canyon (GRCA), Rocky Mountain (ROMO) and Zion (ZION), as well as a system financial summary for Mesa Verde (MEVE) were used to develop annual estimates of ATS operation and vehicle recapitalization needs. It was assumed that no new major ATS will be developed over the course of the long range transportation plan. In addition, it was assumed that the existing systems would continue to provide the current level of service.

The operations estimates provided in the pro forma models was increased by inflation (2.1 percent) annually to estimate a total operating cost for future years through 2035. However, it has been

expressed that the current ATS funding structure is not adequate to meet the future operational needs. Several of the pro forma documents indicated that 2014 is expected to be the "break even" point in terms of system operating budgets and park fees used to fund the service. The total forecast operating budget for the six systems in 2014 was calculated to be approximately $14.5 million per year. For forecast years after 2014, the ATS needs forecasts were separated into two pieces, the $14.5 million per year which is anticipated to be funded on an annual basis based on current practice and the additional "unmet" needs in excess of the $14.5 million. It is anticipated that the park units with the existing ATS systems will identify ways to shift funding to continue to operate their systems. So while in reality ATS operations may not experience "unmet" needs the needs forecasting methodology identified "unmet' needs to help long range plans identify the amount of funding that may need to be shifted in order to continue ATS operations.

Some of the pro forma models also included a recapitalization schedule for the bus fleets. The recapitalization schedule is an annual investment to replace and maintain buses in each shuttle system. The recapitalization schedules for GRCA and ZION were used to estimate a recapitalization schedule for the entire region since those two systems have an established annual recapitalization program. A ratio between capitalization and operating budget was estimated for the two ATS systems and then applied to all six systems. This produced an annual recapitalization estimate in addition to the estimated operating budget.

Yellowstone Recapitalization

The recapitalization of Yellowstone roadways was not included in the forecast transportation budget through 2035. The current roadway widening and replacement projects within Yellowstone secure separate funding from the remainder of the IMR based on the park's individual needs. The remaining roadway recapitalization program is estimated at $850 million. However given the ability to phase roadway improvements within the short construction season without greatly impacting visitor experience in the park, a maximum of $30 million of work per year is able to be completed. As a result, the Yellowstone recapitalization project is expected to extend the length of the long range transportation plan. To properly estimate the needs of Yellowstone recapitalization, an additional $30 million per year beginning in 2015 was added to the needs analysis. This amount of funding was increased by inflation through 2035.

Planning

The current planning program for the IMR was reviewed to identify planning needs that are currently programmed and planning projects that are awaiting funding. The nature of planning is such that there could be an infinite amount of planning needs throughout the region. As a result, the current transportation planning program was used as a based to estimate a representative amount of unmet planning needs. Based on the current backlog of planning projects, it was estimated approximate $1 million worth of additional planning efforts could be reasonably needed on an annual basis. This amount was increased by inflation annually through 2035.

Capital Improvements

Given the current strategy of maintaining existing assets and limiting the construction of new transportation assets, the needs forecasting effort assumed that no additional capital improvement needs in addition to what is included in the forecast transportation budget would be planned. Current capital improvement activities include construction of bicycle/multi-use paths and the construction of missing transportation network links. The efforts have been limited to a few million dollars per year. That current level of capital improvement was assumed to remain constant over the length of the long range transportation plan.

Total Needs Estimation

The unmet needs calculated for each of the asset types and programs above were added to the forecast transportation budget in each forecast year to create a total annual need for the region. The annual need is considered to reasonably include the life cycle costs of transportation assets. As discussed in the Needs Assessment Report, not all needs could be quantified monetarily; however the methodology presented addressed the needs of the great majority of assets and programs within the region to provide a realistic estimate of annual needs at the regional level.