DISSERTATION

DELAY-CAUSED CLAIMS IN INFRASTRUCTURE PROJECTS UNDER DESIGN-BID-BUILD DELIVERY SYSTEMS

Submitted by

Mohammed S. Hashem M. Mehany

Department of Civil and Environmental Engineering

In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Spring 2014

Doctoral Committee:

Advisor: Neil Grigg
Co-Advisor: Angela Guggemos

Darrell Fontane
Bolivar Senior

Copyright by Mohammed S. Hashem M.Mehany 2014

All Rights Reserved

ABSTRACT

DELAY-CAUSED CLAIMS IN INFRASTRUCTURE PROJECTS UNDER DESIGN-BID-BUILD DELIVERY SYSTEMS

Delay-caused claims lead to cost overruns in infrastructure projects due to the cost of construction time and impacts on related services. The purpose of this study was to evaluate the causes and effects of these claims on road and bridge projects and to create an effective claims management system. The study was conducted on road construction because data are more readily-available than for other infrastructures, but findings may apply to other categories, such as the construction of buried utilities. The study was limited to projects where the design-bid-build (DBB) delivery system was used.

The study investigated the driving factors that give rise to claims, such as the extent to which delays affect them; how other parameters affect them; how the methods to estimate and analyze cost and delay claims work; what the most significant cost and resource items for delay-induced claims under DBB contracts are; whether a practical relationship can be established to analyze claims; how a workable claims management system can be created at the lowest level; and how this system can be addressed in DBB contracts. These questions were explored by isolating a list of variables including but not limited to the location of the project according to the Colorado Department of Transportation (CDOT) region plan, budget variations, schedule variations, schedule type, scope of work, and road material type.

Data for the study covered the six regions of CDOT and included 1,060 projects with a timeframe that spanned from 1997 to 2012 with more than 213 claims. Dates on the claims were organized using several Microsoft Access databases and Excel worksheets to screen and organize

all the information where for each claim, the corresponding data on for all the variables were identified and catalogued.

The study used three different methods for statistical analysis including frequency analysis, logistic regression, and correlation analysis to analyze delays and the driving variables. One of the issues explored was how the causes of delays are identified during the complex evolution of the construction project through different methods and techniques. The methods explored included different analytical and forensic techniques including Net Impacted Method, Impacted as Planned (IAP), Collapsed As-Built (CAB), Schedule Window Analysis (SWA), and Time Impact Analysis (TIA). A case study was also formulated to explore and prove the differences between these different analytical and forensic techniques of delays within a construction schedule.

The results indicated that schedule variation is the most significant contributing parameter to claims occurrences in the road infrastructure industry. It identified a significant relationship between schedule and budget variations and showed an expected association between costs and time in claims. Unlike the general consensus of the construction industry that claims occur due to issues of cost and added contract items, the study indicated that schedule delays were the main driver behind claims occurrences.

The case study showed the differences and the manipulation ability of different schedule analysis techniques where a contracting party can analyze the same delays using a certain technique that favors the party's advantage or reduces its responsibility in the delay claim. This in turn shows the need for the standardization of the delay analysis techniques between the contracting parties. It also showed the advantages, disadvantages and accuracy of the different

delay claim analysis techniques and proved the overall superiority of the Time Impact Analysis (TIA) technique due to its accuracy and contemporaneous and proactive approach.

The study included development of a standardized delay claims management system and a set of best practices for owners and contractors to create a fair and proactive process to resolve claims and minimize disputes and delay costs. The claim management system and best practices identify in detail all issues of delay claims management including but not limited to delays in detection and documentation, standardization of the delay analysis method represented in the TIA, weather issues and delays, scheduling specification and delay claims schedule and cost documentations. Given that road agencies generally lack standardized methods of integrated cost and time estimates to facilitate the claim resolution process, a growing number of claims will create more disputes and conflict resolution issues. The identification of major parameters to explain the occurrence of claims and how to deal them in a claims management system should help to lower infrastructure costs and speed completion of projects.

TABLE OF CONTENTS

ABSTRACT ii
LIST OF TABLES viii
LIST OF FIGURES ix
CHAPTER ONE: INTRODUCTION 1
Construction claims as drivers of cost in infrastructure projects 1
Background 2
Infrastructure Importance 2
Cost & Time (delay) overruns and contribution to added costs in infrastructure projects 4
Lack of pro-active resolution for cost-time related claims 5
Design-Bid-Build (DBB) contracts project delivery system 5
Purpose of Research 6
Research methodology and data 6
CHAPTER TWO: LITERATURE REVIEW 8
Claims 9
History of Claims and Dispute Resolution 9
Definition of claims 9
Claims in Road Construction 11
Origins and sources of claims in Road construction projects 11
Cost and Time relationship 35
Different Methods for Claims analysis and Management 37
Construction Items Significance 63
Basic 80/20 Rules 64
Types and Definition of significance 64
Design-Bid-Build (DBB) project delivery system 66
DBB use, benefits and drawback 66
CHAPTER THREE: RESEARCH METHODOLOGY 68
Overview 68
Data Sources 68

Final Project Estimate Reports: 70
Site Manager Project Listing: 70
Project Development Department Access database: 71
CDOT Specification Books: 71
Identification and Description of claim parameters 73
Choice of Analytical Methods 80
Frequency distribution and Percentage Analysis 81
Logistic Regression Analysis 82
Correlation Analysis 83
Case-Study 83
CHAPTER FOUR: ANALYSIS AND RESULTS 85
Frequency Analysis 85
Logistic Regression Analysis 99
Correlation analysis 101
Case Study 104
Case Study Overview 105
Project Facts and General Scope 105
Cost Assumptions 106
Claims Calculation and evaluation 108
Cost Analysis Results – Summary 115
CHAPTER FIVE: FINDINGS, DISCUSSION AND CONCLUSION 116
Findings from CDOT data 116
Statistical Findings 117
Logistic Regression Findings 117
Correlation Findings 117
Cost and Resource Significance Items 117
Case Study Findings 118
Delay Claims Management and Best Practices 118
Outlines of Scheduling Specifications and evaluation standards 119
Schedule Delay analysis standards Method 120
Requirements and Inputs for TIA Application 121

Weather Issues 122
Float Issues, Ownership and Privileges 124
Delay Claim Documentations 125
Future Research 128
Major Conclusions and Lessons Learned 129
REFERENCES 131
APPENDIX A – CLAIMS LIST 146
APPENDIX B – EXAMPLE OF THE PAY ESTIMATES 207
APPENDIX C – PROJECT LISTINGS 234
APPENDIX D – FREQUENCY AND PERCENTAGE ANALYSIS CHARTS 264
APPENDIX E – SPSS ANALYSIS TABLES 274
APPENDIX F – CASE STUDY FIGURES 278

LIST OF TABLES

Table 1. 2013 ASCE Report Card - Published by the American Society of Civil Engineers (ASCE, 2013) 3
Table 2. Claim Parameters details, count and data sources 73
Table 3. CDOT Regions by Zone 74
Table 4. Scope of Work Parameter Categorization 76
Table 5. Scope of Work parameter detailed categorization 76
Table 6. Schedule Type parameter categorization 77
Table 7. Budget Variation parameter Categorization 77
Table 8. Number of Added Items parameter Categorization 78
Table 9. Claim Basis parameter Categorizations 79
Table 10. Levels of Claim Settlement within the CDOT System 80
Table 11. Frequency & Percentage Analysis for Claims Report date and Letting year 86
Table 12. Frequency and Percentage Analysis for Claims per Region 87
Table 13. Frequency and Percentage Analysis for Claims per Scope of work 88
Table 14. Frequency and Percentage Analysis for Claims per project material type 89
Table 15. Frequency and Percentage Analysis for Claims per Schedule Type 89
Table 16. Frequency and Percentage Analysis for Claims per Budget Variation category 90
Table 17. Frequency and Percentage Analysis for Claims per Schedule Variation category 92
Table 18. Frequency and Percentage Analysis of Claims Basis 95
Table 19. Frequency and Percentage Analysis for Claims per Added/Modified Items 97
Table 20. Frequency and Percentage Analysis for Claims per CDOT Level of Settlement 98
Table 21. Claim Parameters used in the Logistic Regression Analysis 99
Table 22. Logistic Regression Main Results 100
Table 23. Correlation Analysis Main Results 103
Table 24. Simplified Itemized Project Costs 107
Table 25. Delays encountered in the project per Activity 109
Table 26. Summary of Time Impact Analysis (TIA) method 113
Table 27. Demonstration of the overall results of the different schedule results from the different scheduling techniques used in the case study 114
Table 28. Summary of the Total Costs related to the delay Claims in the case study 115

LIST OF FIGURES

Figure 1. Work Acceleration Causes, (Leonard, 1998) 19
Figure 2. Classification of Construction delay types, (Kartam, 1999). 28
Figure 3. Construction Delay types, (Nguyen, 2007). 29
Figure 4. Concurrent delay remedy matrix, (Kraiem & Diekman, 1987). 31
Figure 5. Typical Project Cost Breakdown Structure, (Overcash & Harris, 2005). 35
Figure 6. Project data sets 70
Figure 7. Data Sources and its use in the research methodology 72
Figure 8. Geographical representation of CDOT Zones/Regions Locations 75
Figure 9. Overall Research Methodology 81
Figure 10. Frequency Chart for Claims per Budget Variation 91
Figure 11. Frequency Chart for Claim-Contained projects per Budget Variation 91
Figure 12. Frequency Chart for the Total analyzed projects within the Budget variation parameter 92
Figure 13. Frequency Chart for Claims per Schedule Variation 93
Figure 14. Frequency Chart for Claim-Contained projects per Schedule Variation 94
Figure 15. Frequency Chart for the Total analyzed projects within the Schedule variation parameter 94
Figure 16. Frequency Chart for the Claim Basis per CDOT unanticipated Conditions 96
Figure 17. Pie Chart for the Claim Basis per CDOT Specification Sections 96
Figure 18. Frequency Chart for Claims per Settlement Level 98
Figure 19. Case Study Methodologies Layout 105
Figure 20. Summary of the Window Analysis Results 112

CHAPTER ONE: INTRODUCTION

Construction claims as drivers of cost in infrastructure projects

A proactive approach for dispute resolution of construction claims is required to address the escalating cost of public infrastructure projects of all types. This study probes construction claims on road infrastructure projects, which are interdependent with water and energy systems and have vital roles in most aspects of life and the economy.

The issues addressed in this research relate to other infrastructures including energy and water systems. The study of construction claims occurrence in road infrastructures is more feasible due to the robustness of the databases, which are more extensive than for pipe networks, for example. Results from this research can be transferred to other infrastructure types.

The study investigates the driving factors of claims occurrence in road projects, such as the extent to which delays affect them; how other parameters affect them; how the methods to estimate and analyze cost and delay claims work; what the most significant cost and resource items for delay-induced claims under DBB contracts are; whether a practical relationship can be established to analyze claims; how a workable claims management system can be created at the lowest level; and how this system can be addressed in DBB contracts.

To focus the study, a standardized system for claims management to fit the roads construction industry under the conventional Design Bid Build (DBB) project delivery system is utilized. It may apply to any category of infrastructure, including heavy construction such as dams and utility infrastructure such as buried pipelines.

The study will begin by emphasizing the general role of delay claims in higher costs and disputes in the construction industry and specifically in the road infrastructure industry. Chapter Two will then explore all different aspects of claims including but not limited to their history, types, reasons and sources and the different methods of analysis with respect to time and cost represented in schedules and budgets of projects. In Chapter Three, the methodology of conducting the research is explained. This chapter will discuss the types and sources of data collected, the methods of analysis, and how these data are processed and organized. The chapter lists three different statistical analysis methods, including frequency analysis, logistic regression, and correlation analysis and finally, a case study is conducted to explore and prove the differences between the different analytical and forensic techniques of the delay within a construction schedule. Chapter Four will present the results for each of the statistical analysis methods along with the case study results. Finally, Chapter Five will discuss and conclude the findings from Chapter Four and present the conclusions, lessons learned and several future research opportunities.

Background

Infrastructure Importance

Infrastructure provides the basis for a society or an enterprise and includes many systems (Tatom, 1996) such as public buildings, roads, electric power, water and sewerage systems to support quality of life and healthy economy (Wall, 2008). The more developed a nation is, the more complex its infrastructure must be to accommodate its needs. Infrastructure systems and networks become more complex over time as they are modified or rebuilt.

A reported infrastructure crisis developed in U.S in the early 1980s following the publication of “America in Ruins” (Choate & Walter, 1981; Saunders, 1993). The infrastructure

crisis can be attributed to two main reasons, a faster deterioration rate than rehabilitation or replacement and lack of funding (Choate & Walter, 1981). Currently, reporting of the status of infrastructure is by the ASCE Infrastructure Report Card as shown in Table 1.

Table 1. 2013 ASCE Report Card (ASCE, 2013)

	ASCE Report Card issuance year			
Category	***2001***	***2005***	***2009***	***2013***
Aviation	D	D+	D	D
Bridges	C	C	C	C+
Dams	D	D	D	D
Drinking Water	D	D-	D-	D
Energy (National Power grid	D+	D	D+	D+
Hazardous Waste	D+	D	D	D
Navigable Waterways	D+	D-	D-	D
Public Parks & Recreation	--	C-	C-	C-
Rail	--	C-	C-	C+
Roads	D+	D	D-	D
Schools	D-	D	D	D
Solid Waste	C+	C+	C+	B-
Transit	C-	D+	D	D
Wastewater	D	D-	D-	D
ASCE Report card 2013 - divide the navigable water into 3 categories, Inland waterways (D-), Levees (D-) and Ports (C)				

The report card shows that 6.6% of Colorado's 8,591 bridges are considered structurally deficient and 10.6% of them are functionally obsolete. As for roads, 70% are in poor or mediocre condition and Colorado's overall 2010 report grade is C+ (ASCE Report Card, 2013)

Roads have been the most important infrastructure system since ancient times, and stone paved streets found in the city of Ur in the Middle East dating back to 4000 BC (Lay & Vance, 1992). Road construction represents around one-third of the total public capital excluding military structures in the U.S. (Gramlich, 1994; Tatom, 1996). However, roads and highway

projects are risky because of their long duration, quality concerns and the probability of cost overruns. Road deterioration is a major problem in the infrastructure crisis. For example, the nation's 42,500 mile Interstate Highway system carries over 20% of all highway traffic and is deteriorating at a rate that requires reconstruction of 2,000 miles per year. However, lack of funding or underinvestment dates back to the 1970s (Choate & Walter, 1981; Kettl, 2010; Reid, 2008).

During road construction, cost, time and quality are major concerns. Another important factor is the geographic and logistical interdependency of road infrastructure with other infrastructure systems (Rinaldi, Peerenboom & Kelly, 2001). Delays have a major role in cost overruns taking into account the time value and related impacts on other services.

Cost & Time (delay) overruns and contribution to added costs in infrastructure projects

Cost overruns are common in road construction projects. One of the most comprehensive studies of cost overrun that exists found that 9 out of 10 projects had overrun, overruns of 50 to 100 percent were common, overrun was found in each of 20 nations and five continents covered by the study, and overrun had been constant for the 70 years for which data were available (Hackney, 1997).

These are significant in infrastructure projects due to their large size and several studies have shown that overruns are experienced regularly in delivery of infrastructure projects with high costs (Flyvbjerg, Holm & Buhl, 2002, 2004).

Construction claims begin as change orders or added items but delay claims can be attributed to factors such as weather, disruption of work, unforeseen site conditions and others. Many cost claims are time and delay claims that experts call compensable delay claims (Kraiem

& Diekmann, 1987). The main problem seems to be the claims management system which is not effective to deal with them in a predictive manner with effective tools. As a result, a large growing number of claims will mean more disputes and conflict resolution issues.

Lack of pro-active resolution for cost-time related claims

While it is impossible to completely avoid claims, it is possible to mitigate their frequency and deal with them proactively. Most of the Departments of Transportation (DOTs) across the U.S have a claims or a dispute resolution process in their standard contracts. However, most processes are long and time consuming and encourage the escalation of the problem. The real problem is that even at the origin of the problem the agencies lack standardized methods of integrated cost and time estimates to facilitate the claim resolution process. A major issue is the time cost in delay claims and the fair compensation. Therefore, the development of practical techniques to address the cost-time relationship is important in a proactive approach.

Design-Bid-Build (DBB) contracts project delivery system

The most common road project delivery system in U.S is the DBB system. This is a method where the owner contracts with separate entities for design, construction and sometimes other entities. It is composed of the design phase, the bidding phase and the construction phase.

The DBB method is the focus of this study. It is widely used and accepted and has clearly defined roles for the contracting agency and the constructor (FHWA, 2012). For example, the design-bid-build method was used in Boston's Central Artery/Tunnel (CA/T or the "Big Dig") Project. Managed by the Massachusetts Turnpike Authority, the project totaled about $14.6 billion in cost (Yakowenko, 2004).

Purpose of Research

To respond to the evident problems of delays and construction claims the research was designed to explore the different claim parameters in road projects and mitigate risk and disputes by developing standardized methods for a proactive claims management system.

The specific goals of the research are to:

1) Explore methodologies and techniques for estimating cost and delay claims and their integration.
2) Explore different claims parameters and their significance on claim occurrence.
3) Create a practical claims management system with best practices for fair compensation for road projects under DBB delivery systems at the lowest level.
4) Standardize methods of cost and delay estimates for claims by owner and contractor to be utilized in a practical framework.
5) Incorporate the claims management system in common forms of DBB contracts for road projects.

Research methodology and data

The research begins with a hypothesis of the main parameters that affect cost and delay claims. The analysis uses a quantitative methodology based on statistical analysis of representative samples of project data drawn from road construction in Colorado. A case study discussion is also included to illustrate how the significant variables interact with each other within different forensic shceduling techniques for claims.

The analysis is focused on a set of six research questions:

1) Does the delay affect the costs of the claim and how?

2) What are the different parameters that affect the occurrence of claims in road projects?

3) What are the different methods to estimate and analyze the cost and delay claims?

4) What are the most significant cost & resource items for delay-induced claims in road construction under DBB contracts?

5) Can a practical claim relationship be established?

6) How can a practical standardized yet simple claims management system be put together to help solve the claim at the lowest level?

The data comprises project results from the Colorado Department of Transportation (CDOT). It also includes claims related to projects from 1997 to 2012. The data include but are not limited to: date of claim report, location of project according to CDOT regional classifications, scope of work, project type, specification type, year of contract initiation and other factors to be discussed in the methodology chapter.

CHAPTER TWO: LITERATURE REVIEW

The background of claims and delays comprises knowledge about claims and dispute resolution, the reasons and triggers of claims, the definition of the types and causes of delays, and the relationship of costs and damages to claims. Methods of claims analysis and quantification are discussed, including direct and indirect costs and schedules and productivity loss analysis methodologies. How the heavy civil construction industry works and the categorization of variables and use in claim analysis is important, along with how the DBB project delivery system works.

Much literature has been focused on the problem discussed in this research whether it is quantifying the claim delays or costs in a separate manner (Al-Momani, 2000; Kraiem & Diekman, 1987). Others dealt with the same problem in a very generalized view of the whole process of constrcution claims adiminstration, where they address the problem in a very general perspective (Abdul-Malak, El-Saadi & Abou-Zeid, 2002; Jergeas & Hartman 1994; McGowan, Horner ,Zakieh, Jones & Thompson, 1992; Semple, Hartman & Jergeas, 1994). Some literature can be found concerning cost and time claims. However, it deals with the cost and time parameters without realizing the other contributing parameters that affect this relationship in a major way (Shr & Chen, 2006). Another major contribution is addressing the legal aspect of the problem by suggesting the inclusion of this claims management system in DBB contracts that are widely used in the practical road construction on a daily basis.

Claims

History of Claims and Dispute Resolution

Claims and disputes can be traced as far as human existence. However, the formalized stages of dispute resolution processes in the US was formed as early as in 1887 when the federal government promoted commercial arbitration by passing the Interstate Commerce Act which was primarily for labor disputes and railroad industries. In 1922, the Arbitration Society of America was founded by Francis Kellor as the first formal organization to implement dispute resolution services and the Arbitration Foundation was formed in 1924. By 1925, Congress passed the Federal Arbitration Act which enforces the arbitration of contractual disputes involving commerce. Then, in 1926, The Arbitration Society of America and the Arbitration Foundation merged to form the American Arbitration Association (AAA) which became the predominant organization for developing the dispute resolution guidelines and services, the same guidelines that the American Institute of Architects has been using and evolving for arbitration and dispute resolution in its standard forms of contracts until now (AAA, 2012).

Definition of claims

The general public and people who are not involved in the construction claims area can confuse terms like claims, disputes, conflict, change order, or a variation order. This section will provide a comprehensive understanding of the meaning and the evolution and linkage of those terms.

There are numerous claim definitions in the literature. Diekmann and Nelson (1985) defined the claim as the seeking of consideration or change, or both, by one of the parties to a contract based on an implied or express contract provision. While others stated that the claim

arises when the contractor or owner claims that a change exists in their favor with no resolution reached, and the dispute becomes subject to a formalized dispute resolution process (Halligan, Hester & Thomas, 1987). Another simple definition of the claim is as a situation where the contractor, rightly or wrongly, requests an adjustment in the original contract time/cost (Dalton & Shehadeh, 1992). Another recent definition of the construction claim is a “demand asserted by one party on another party relating to the services or products specified in the contract” (Bernard, 2005). One more comprehensive definition of claim was stated as “a demand or request or application for something to which a contractor considers, believes or contends he is entitled but in respect of which agreement has not yet been reached” (Hughes, 1985).

According to the Institution of Civil Engineers (ICE), the claim exists when a contractor seeks a higher rate than the one set by the engineer after an ordered variation (ICE, 1999). Another institutional definition can be found in the Project Management Institute (PMI) documentation where the Project Management Body of knowledge (PMBOK) defines the claim as a request or assertion of rights by the contractor or the owner for compensation under the terms of a legally binding contract, such as for a disputed change (PMI, 2008).

From those definitions, one can conclude that a claim can arise as a matter of conflict between two parties mostly the contractor and the owner that is disputed and materialized as a claim after it was originated as a change or a variation. This proves that all those terms are linked in a chain of actions that is escalated due to disputing an assertion of right to one of the parties. There is legal precedent and ample evidence from standard forms of contract that, in a contractual sense, a dispute only comes into being after a claim has been made and been rejected (Ndekugri & Russell, 2006; Reid & Ellis, 2007) which proves the above scenario of escalation from a change order or a variation to a claim and a dispute..

Claims in Road Construction

As mentioned before in the introduction chapter, claims have been one of the major additional costs to infrastructure projects and specifically road construction projects. This is due to the fact of the complexity and the competitive bidding nature of the work, since they are mostly public projects, along with the broad range of uncertainty where the work is taking place, since the sites are often huge, the work is performed over long periods of time, and the material used is considerably volatile in global market prices. All those circumstances may come together to form a perfect host for claims - a very common natural feature in road construction and rehabilitation projects.

"Most of claims in construction projects in general and in road projects in specific are contractor-originated claims based on client risk events" (McGowan, 1994). These claims can be attributed to several reasons and origins, some are controllable, and others are not. It all comes down to which particular party in a contract is willing to accept the responsibility or the liability for any costs or delays incurred under any circumstances. That is one of the main reasons that it is very important to study and be aware of the sources and origins of the claims in those projects which leads to some fairness of who should incur the liability of a risk or an event that materialized into a claim.

Origins and sources of claims in Road construction projects

When it comes to the causes and origins of infrastructure claims, the literature mentions different causes and origins, each having its different reasoning or perspective, whether it is the owner's perspective, the contractor's perspective, or the consultant's perspective. Other literature has the reasons of claims organized according to the industry or a region as in a country or a state.

One writer describes the most frequent causes for claims in construction industry as the following (Revay, 1993):

1) Inadequate site &/or soil investigation prior to starting the design.
2) Starting the design effort too late &/or unduly limiting the cost of engineering/design.
3) Calling for bids with an incomplete set of drawings.
4) Endeavoring to complete the design through shop drawing review.
5) Introducing untimely design revisions without allowing commensurate time extension for the completion of the project or without recognizing the contractor's right to impact cost.
6) Interfering both with the sequence & timing of construction.
7) Continuing to introduce changes under the disguise of correcting deficiencies.

Another general perspective of construction claims-causing factors was described by a law firm, a consultant perspective, as the following (Ip, 2002):

- Delays in construction and completion of the contract;
- Delays in the delivery and supply of materials;
- Weather, which slows down or prevents construction from proceeding;
- Owner requested changes;
- Changes which occur not at the request of the owner;
- Poor management and administration of the construction site;
- Site conditions which differ from those expected;
- The work becomes impossible to perform;
- Insufficient plans and specifications;
- Failure of any one party to disclose information which is material to the construction;
- Conflicts between those involved in the construction of a project;
- Termination of the contract by the owner or the contractor;
- Acceleration of the work;
- Failure to adequately schedule and coordinate the work; and

- Failure of parties to cooperate with each other in the performance of the work.

An older study was conducted according to regional construction in western Canada found that the most common causes of claims are (1) acceleration, (2) restricted access, (3) severe weather, and (4) increase in scope (Semple et al., 1994).

The fact is, the causes and origins of claims are numerous and different in their causality and how and when they appear during the construction project. This is why one must study the causes and origins of claims according to the data available on which he can develop an understanding based on the different factors involved behind those causes. In this literature, the causes of claims will be organized based on the two main claim types which are: (1) cost claims related to changes and added items during a road construction or rehabilitation project and; (2) time claims related to delays and disruptions. This way, the literature can explore different causes and origins under two main areas of claims that will be related to the research subject matter and the data that will be collected for this research into a later chapter.

Changes and Disruption

Changes are a natural part of our lives and a consequential part of any construction project. There is often confusion between the words change and change orders. A change refers to any difference between how the work was planned versus how it was actually performed, which doesn't necessarily mean that the change has been formalized as a change order (Lee, 2007). This implies that a change can occur but goes unrecognized and that a change order is recognition and a formalization of that change.

Several texts define both terms separately. Ibbs, Wong and Kwak defined the change in terms of project cost and schedule as any "Any additions, deletions, or other revision to project goals and scope are considered to be changes, whether they increase or decrease the project cost

or schedule" (2001). While Hanna, Camlic, Peterson and Nordheim defined the change in a more collective manner as "any event that results in a modification of the original scope, execution time, or cost of work, is inevitable on most construction projects due to the uniqueness of each project and the limited resources of time and money available for planning" (2002).

Much literature has defined change orders in varying perspectives. It was defined from a contractual point of view by Schwartzkopf as "a formal contract modification incorporating a change into the contract" (2004). The Federal Highway Administration divided the change into two main categories (1) Major Change or Major Extra Work: A change which will significantly affect the cost of the project to the Federal government or alter the termini, character or scope of work (23 CFR 635.102) and (2) Non-Major Change or Non-Major Extra Work: All that do not fall under the definition of "major change order or major extra work" (FHWA, 2001).

As changes can be a necessity on any construction project whether it is an added, cancelled, or modified item in the project's scope, or other kinds of changes, they tend to have several negative impacts and effects on the construction at times. These impacts can be categorized as direct impacts, indirect impacts and productivity loss impacts, and it can be a combination of all the impacts which was recognized by U.S. Court of Claims and various boards of contract appeals as a general right to recover for the cumulative effect of a multitude of owner-directed changes and change impacts (Jones, 2001). The real problem is that contractors and owners seldom agrees on the responsibility, need, and impacts of a change at the time of occurrence, which makes those changes a major source of claims and may result in litigation at times (Lee, 2007; Moselhi, Leonard & Fazio, 1991) or let them be ignored and burden the negative consequences of the impacts at the end of the project in the form of liquidated damages and disputes.

The direct impacts of a change are the impacts on the other unchanged work, but are not covered in the change order issued schedule or cost wise. However, they can affect the planning of the whole project. For example, an added item (e.g. a culvert in a road rehabilitation project) may need a great deal of change in the already existing plan to accommodate for it which can take longer time and adjustment on other items that have to be constructed around it. These impacts have to be accounted for within the contract time and cost. One of the perspectives for a direct impact of a change given by the U.S. Army Corps of Engineers and summarized by Lee (Lee, 2007; USACE, 1979) suggests the following questions, for a change impact to be considered direct impact:

1- Has any activity been moved from a favorable to an unfavorable weather season?
2- Are there now more activities in progress at a given time than before the revision?
3- Have any activities slipped to the extent that significant phases of the work will not be accomplished before overriding factors (such as winter, high water stages, unavailability of site) prevent its completion, thus making it necessary to defer a portion of work until the next favorable season.

The indirect impacts of change are mostly the impacts that are not affected on the construction site. This can be overhead as in site and office overheads, along with interest, bonds, and profit loss. For example, a change (e.g. financing halt or work suspension) might slow down the work progress that extends the overall project duration, which results in greater overhead represented in staff salaries (e.g. project manager and superintendent) and assets onsite (e.g. trailers, fences, etc..).

The productivity losses can be translated into numerous claims. These claims have to prove three elements: (1) liability: the claim has to prove that the owner is the contractual party responsible for the loss, (2) causation: the claim has to prove that the losses incurred are mainly because the lost productivity, and (3) resultant injury: The claim has to prove and show the resulted losses due to that loss in productivity (Jones, 2001). These are the impacts of changes which can take place in a lot of forms and shapes in a road construction project, but going back to the main point of this section which is what are the main origins of that change, and what can make those impacts. Those main change origins that will be discussed in the following sections are acceleration, disruption, over manning and congestion, shift work and overtime, weather, learning curve, and the different combination of all these change impacts origins. It is also worth noting that most of those causes of claims/changes are related somehow directly or indirectly to the loss of productivity.

Disruption:

Disruption is generally related to changes and has been simply defined as “an action or event which hinders a party from proceeding with the work or some portions of the work as planned or scheduled” (McDonald & Zack, 2004). Most of the scientific definitions of disruption are related to the productivity loss aspect, such as the definition by Fink as an activity-specific productivity loss that is caused by changes in working conditions where the activity is performed (Fink, 2000). Another by Meyer is a change of the conditions expected at the bid from those encountered causing lost productivity, increased difficulty, and increased costs (Meyer, 1994). Other authors relate disruptions primarily to productivity losses (Hanna, Lotfallah & Lee, 2002; Thomas & Napolitan, 1995; Thomas & Rynar, 1997).

There are mainly two types of disruption that are categorized according to their foreseeability and impacts which also relate to how they are quantified and estimated. The first type is foreseeable disruptions, which are disruptions that can be and should be anticipated, and are easily accounted before or during the project. The second type is the unforeseeable disruptions that cannot be accounted for in the project plan because they couldn't have been anticipated or accounted for. The foreseeable disruptions are labeled as "local disruptions" that happen in the same time and in the same place or within the same resources as the changed or disrupted work while unforeseeable disruption are as "cumulative disruptions" that happen between two or more changes or disruptions and basic work which is same as cumulative change that have been defined earlier (Fink, 1998; Jones, 2001).

The main difference between local impact disruptions and changes and the cumulative is the complexity of the quantification process for claims and change orders. The local impact is easier to quantify in advance of its occurrence and accounted for by contingencies and buffers. However, the cumulative impacts are hard to estimate beforehand and have to be estimated upon completion of the project or the phase in which it occurred because of its ripple effect nature exactly as the cumulative change (Jones, 2001).

Acceleration:

Acceleration can be simply defined as the process by which the ordinary progress of a construction project is quickened or compressed to achieve reduction in the project duration (Wright, 1991). Another project acceleration definition is having more work to perform in the same period of time or having a shorter period of time to perform the same amount of work (Thomas, 2000). Normally, the contractor can accomplish the acceleration through several techniques including but not limited to (1) re-sequencing work activities, (2) increasing the

productivity through over-time and/or shiftwork, (3) adding extra equipment, and (4) expediting material and equipment deliveries.

Acceleration can be divided into three main types. Those are directed acceleration, voluntary acceleration, and constructive acceleration. Directed acceleration entails an owner requirement to perform the same initial scope of work in shorter duration than the agreed upon duration upfront, which is mostly understood that any additional compensation will be paid by the owner. On the other hand, voluntary acceleration is acceleration with no request from the owner to accelerate the work, and in which case there will be no owner compensation. Finally, the constructive acceleration which is the most debated one and accounts for a lot of initiated claims. That was one of the reasons why the Board of Contract Appeals has set forth the five elements of a constructive acceleration as in the following (Wray, 2008).

1. An excusable delay must exist;

2. Timely notice of the delay and a proper request for a time extension must have been given;

3. The time extension must have been postponed or refused;

4. The owner must have ordered (either by coercion, direction or some other manner) the project completed within its original performance period; and

5. The contractor must actually accelerate its performance, thereby incurring excess costs.

Acceleration of construction projects in general have been a frequent phenomenon over the last decades. In 1988, Leonard conducted a comprehensive study at Concordia University which shows that out of 90 cases examined, 26 were forced to accelerate the work. However, the causes of acceleration were due to the causes shown in Fig.1 (Leonard, 1998). This shows that in

most cases it is due to the fact that owners are adamant about granting time extensions to contractors. This, in an indirect manner, points to the fact that owners do not approve most time claim or time extension change orders.

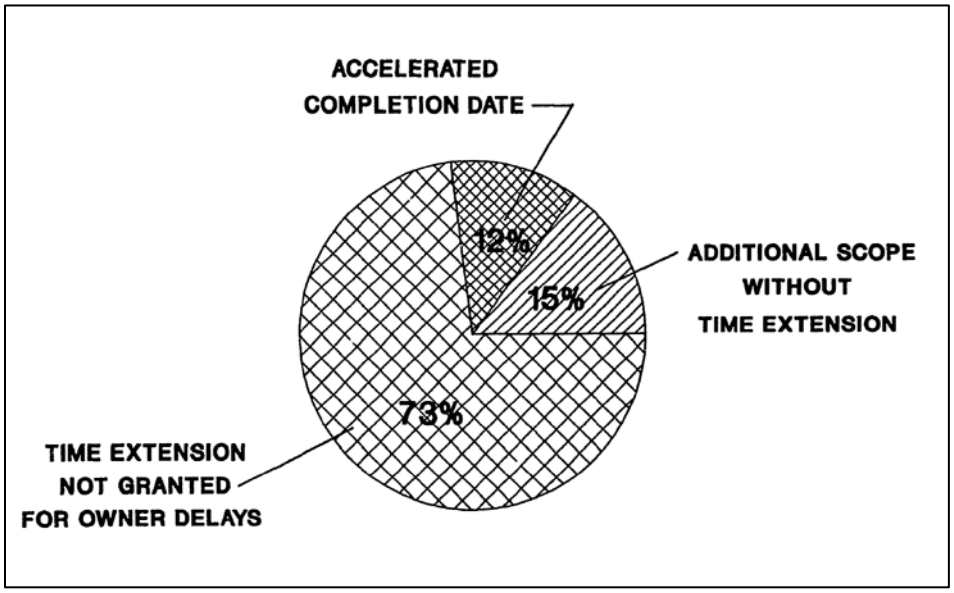


Figure 1. Work Acceleration Causes, (Leonard, 1998)

In most cases, acceleration is accompanied with a lot of additional costs to execute those acceleration techniques mentioned above whether it is additional labor, extra works shifts, additional equipment, or fast tracking of the work sequence. The major issue with acceleration is that it is a root cause for other claim sources represented in their techniques. Those are overtime, over manning and congestion, and shift work. It is also worth mentioning that those same techniques are the basis for quantification of acceleration claims by counting the extra man-hours/ machine-hours that were used to compensate for the accelerated time.

Overtime

Overtime can be referred to as planning to accelerate the work progress by scheduling more than 40 work hours per week for the work force (Thomas & Raynar, 1997). It can also be

defined as an act to achieve schedule acceleration by increasing the amount of labor hours beyond the normal working shift, which is 40 hour per week, or whatever the work shift is in different countries (Hanna, Taylor & Sullivan 2005). There are two types of overtime that are being used in the construction industry. The first is the "sporadic overtime" which is mostly used to handle sudden problems and unexpected delays in order to get back on the critical path. The second type of overtime is "extended overtime" which is a planned overtime strategy that is mostly used in project acceleration for the main goal of finishing a project earlier.

The negative effects of overtime are numerous and have been studied extensively over the last century. The negative effects of overtime can be attributed to three main areas. The first area is the additional cost since the overtime hourly rates are way more than normal ones. The second area is safety, where the fatigued workers are more prone to accidents and injuries. This has been proven by several studies that schedules with long working hours cause more injuries and accidents especially in a hazardous industry like the construction industry (Dembe, Erickson, Delbos & Banks, 2005), and which is responsible for 23% of the deaths and 10.3% of the injury accidents every year according to the National Safety Council (Peurifoy, Schexnayder, Schmitt, & Shapira, 2010). The third and final area is the productivity which is affected by lower productivity due to labor fatigue and in some cases, the inability to provide material and information in a timely manner ((Thomas & Raynar, 1997).

Over manning

Over manning can simply be defined as adding more workers to an activity than the optimum crew size for the type of work to be completed (USACE, 1979), where the optimum crew size represents the balanced acceptable rate of progress and the maximum return in labor dollar invested according to the common industry practice (Gunduz, 2004). The over manning

techniques can be achieved by different method. This can be achieved through adding workers to the existing crew or an equipment fleet or by adding an additional crew of workers or equipment fleet.

Over manning eliminates the physical fatigue factor in the overtime but it triggers other factors that contribute to productivity loss. This is because the technique applies to the rule of diminishing return, which means that each worker added to the crew will not increase the productivity same as the previous worker in linear fashion, and as a matter of fact there is a breaking point where there will be no contribution at all to the productivity by adding any more workers. Other factors like the lack of adequate supervision for all the added workers, greater accident rates, and in some cases the additional members are not adequately trained contributing to higher cost per unit hour (Gunduz, 2004). Another factor that can be triggered is the site congestion and trade stacking that can contribute to production loss. Some might not see the occurrence of congestion and stacking in road construction industry, but trade stacking is a very common issue. However, the site congestion is a very viable situation that can happen in urban areas (e.g. Denver Metro region), where it is not like a building operated within an owner's premises, but it is a public project with multiple equipment and crews that sometime operate on open traffic roads, which increases the chance of multiple different crews and machines in the same work space.

Shift Work

Shift work can be defined as "the hours worked by a second group of craftsmen whose work on a project is performed after the first, or primary, work force of the same trade has retired for the day" (Hanna, Chang, Sullivan, & Lackney, 2005). The shift work can eliminate several problems mentioned in the previous techniques where it can eliminate the fatigue factor and the

high costs paid from the overtime and it can also eliminate the congestion factor that is experienced in the over manning. However, there are several negative impacts that can happen using shift work.

There is a little literature about the impacts of shift work in the construction industry and the limited literature mostly addresses the labor-intensive kinds of the construction industry and specifically the mechanical contracting area of the construction industry.

The two most comprehensive studies found were both applied towards the area of the mechanical contracting by MCAA and Hanna, Chang, Sullivan, & Lackney (Hanna et.al, 2005). It is also worthy to note that the least impacts of the shift work is the added cost of supervision on the project site.

Weather

Climate always play a great role in construction industry as adverse weather has been one of the most common origins of claims in the construction industry, where it proved to be the second leading cause of the claims in 24 projects investigated in Western Canada (Semple et al., 1994), and the leading cause of claims in 67 civil engineering projects in Hong Kong (Yogeswaran, Kumaraswamy, & Miller, 1998). Adverse weather condition is often confused with extreme weather conditions in general which makes it necessary to differentiate between the foreseeable and unforeseeable weather conditions. The fact is, normal weather conditions include extreme weather conditions encountered through several seasons where it is considered foreseeable and most construction contracts incorporate severe weather conditions and should differentiate between normally and abnormally severe weather conditions (Nguyen, Kneppers, García de Soto, & Ibbs, 2010). The claimed adverse weather conditions, though, refers to an unusual weather events like sudden freezing temperatures, flash floods, and unexpected

prolonged winter seasons in cold winter states (e.g. Colorado), or a weather season that turns to be worse than expected and accounted for in the contract.

Again, like many other claim causes, it relates not only to schedule delays but also to productivity losses since adverse weather (hot or cold) affects the workers physically and physiologically where a study mentioned four factors that determine the degree of stress created by environmental weather conditions as (1) air temperature, (2) humidity, (3) air movement, and (4) heat radiation (Hancher & Abd-Elkhalek, 1998). It also affects the equipment and machine mobility and productivity too. An example in the road construction industry can be excavation and earthwork during freezing seasons or paving during low temperature.

A claim for adverse weather conditions should include two types of documentation to validate it. The first documentation should compare the actual onsite conditions with the historical weather condition at the closest weather station, which is normally included in the contract or well known to the most inhabitants. The second documentation is a quantitative estimate of exactly how many days are affected by the adverse weather conditions and the consequent damages of delays and cost compensations (Moselhi & El-Rayes, 2002).

Learning Curve

Learning curve can be defined as a graph of proficiency versus practice (Thomas, 2009) that is based on the concept that the unit cost or unit time of production decreases as the number of practice and work repetition increases (Lee, 2007). There are several reasons behind those concepts that were stated by Thomas, Mathews and Ward as (1) increased worker familiarization; (2) improved equipment and crew coordination; (3) improved job organization; (4) better engineering support; (5) better day-to-day management and supervision; (6) development of more efficient techniques and methods; (7) development of more efficient material supply systems; and (8) stabilized design leading to fewer modifications and rework

(Thomas, Mathews, & Ward, 1986). The first scientific industrial learning curve is dated back to 1936 that was published by Theodore Paul Wright to describe the effect of learning on labor productivity in the aircraft industry and proposed a mathematical model of the learning curve (Wright, 1936). The learning curve concept has appeared frequently in claims and sometimes is used as a basis for calculating some portion of monetary damages (Thomas, 2009).

The learning curve has been directed more towards the labor intensive work such as commercial buildings however, it can be argued that it can be used in an equipment intensive industry like the road construction industry, in activities such earthwork movement and paving operations in terms of the rhythm of work pace instead of learning the operations itself.
It is also worth mentioning that all of the previous claim and change origins that have been discussed so far can be combined partially or completely according to the claim situation.

Delays:

Delay seems to be a self-explanatory term. However, it is often confused with disruption and opposing acceleration. The delay can be simply defined as the occurrences that affect the time required to complete a particular task (Meynaride & Molavi, 2007), or the time during which a project cannot proceed as planned (Lovejoy, 2004). From the contract perspective it can be defined as the act that extends the time to execute the contract activities (Stumpf, 2000), and a more detailed definition is that the delay is an event when one or more contractual parties jointly or separately contribute to the non-completion of the project within the original or the stipulated or agreed contract period (Aibinu & Jagboro, 2002).

To clear the general confusion between the terms delay, disruption and acceleration, one has to know the simple differences and linkage between the terms. The main difference between delay and disruption is their claim's damages and nature. The delay claim and damages have to

be related to the overall project, phase or a milestone completion and the claim have to prove that the contract performance period have been prolonged as a result of some event, while the disruption claims are related to the productivity losses caused by changes and it doesn't need the assertion of time delays (Fink, 2000; Gavin 2001). On the other hand, acceleration is linked to the delay in a causality relationship. In other words, acceleration can materialize as a consequence of a delay event (Nguyen, 2007). As a result, the disruption can cause a delay but a delay does not entail a disruption while acceleration might be a result of delay but a delay does not have to be a result of acceleration.

Construction Delays impacts

Delays have become a common worldwide phenomenon in construction projects and specifically in heavy civil and infrastructure projects like construction and rehabilitation projects. This is evident in several studies worldwide in many different countries where the construction delays have been experienced in most of the construction projects studied (Aibinu & Jagboro, 2002; Assaf & Al-Hejji, 2006; Haseeb, Xinhai-Lu, Bibi, Maloof-ud-Dyian & Rabbani, 2011). It is no surprise that delays have increasingly negative impacts on the construction industry and is one of the main reasons for claims in the construction industry due to its notorious costly nature that affect all of the contractual parties (Kaliba, Muya & Mumba, 2009). These impacts are worsened when it comes to the road construction and rehabilitation industry because of its public ownership nature along with its complexity and size. This is why one the main objectives of the "State Highway Agency" (SHA) is a timely completion of the road construction projects since it is related to the several aspect of economy, welfare, and safety (Ellis & Thomas, 2002). In 1985, a Federal Highway Administration (FHWA) study presented a 44% average time delay in the overall projects studied out of 1,731 highway projects studied in five states around the U.S. (Thomas, Hester, Hunter & Logan, 1985).

Causes of Construction Delays

There are numerous causes affecting construction schedule delays. It is hard to strictly define the causes of construction delays since every construction project is unique and experience different conditions that can contribute to the construction delays. Several studies have examined different causes of delays all around the world. In Jordan, a study was conducted to identify the top ten most important factors that cause delays in the construction industry from the contractors and consultants perspective (Odeh & Battaineh, 2002). Assaf and Al-Hejji identified 73 causes of delay in a field survey that included 23 contractors, 19 consultants and 15 owners (Assaf & Al-Hejji, 2006). Another study in Hong Kong covered 83 delay factors that were grouped under eight main categories (Chan & Kumaraswamy, 1997). Other studies identified different causes and factors for construction delays in different countries and conditions (Abd El-Razek, Bassioni & Mobarak, 2008; Alwi & Hampson, 2003; CIEM Reporter, 2010; Porrostam & Ismail, 2011).

In the road construction industry, the causes of delays can be more complex due to the aforementioned factors affecting the complexity of road construction projects. A research study included 34 contractors and 30 consultants identified a total of 52 causes of delay in the road construction projects (Mahamid, Bruland & Dmaidi, 2012). Another thorough study that was conducted using 1,722 highway projects data in Indiana, using random-parameter statistical models, showed the most important factors influencing project time delays (Anastasopoulos, Labi, Bhargava, Mannering, 2012). Last but not least, a national study was conducted including 1,000 surveys to industry professionals including SHAs, Contractors, Design Consultants and various highway professional organizations have identified the most frequent causes of road projects construction delays under five main categories (Ellis & Thomas, 2002).

Costs of Delay

Since time and money are inseparable, delay costs can be very significant when any project suffers a major critical delay. Delay costs can include a lot of different costs including direct costs (e.g. labor and equipment), indirect costs (e.g. Home office overheads), and others from the contractor's perspective, and mainly liquidated damages from the owner's perspective (Last, 1997). A consultant-oriented study investigating the percentage construction cost spent for delays including all the consultants appearing on "THE ENR 500" indicated that 30.3% of the overall yearly construction cost of projects in which "The ENR 500" consultants are involved is spent for construction delays (Koehn, Young, Kuchar & Seling, 1978). No matter how accurate the percentage presented in this study is, there can be no denying that delays are one of the most contributing factors to construction projects cost overruns. Those delay costs have to be allocated to one of the two parties in contracts, the owner or the contractor. This can be only determined according to the type of delay as in the following section.

Types of Delays

Schedule delay types have been classified in several ways and forms. Most literature classified the schedule delays according to responsibility and compensability as in the following four main categories; excusable, non-excusable, compensable, and concurrent delays (Kariem & Diekman, 1987; Trauner, 2009; Zack, 2000; Zack, 2006). A more comprehensive approach to classify the different types of construction delays was classified according to the delays origin, timing and compensability as shown in Figure 2 (Kartam, 1999).

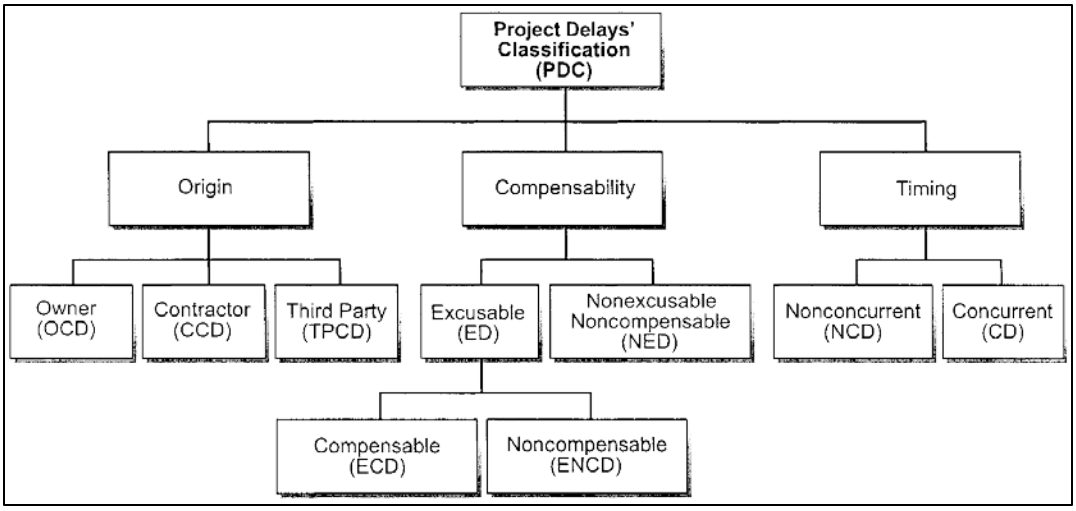


Figure 2. Classification of Construction delay types, (Kartam, 1999).

The origin of the delays is according to the party responsible for the delay, the compensability of the delay fall back to the excusable or non-excusable nature of the delay while the timing issue is dealing with the concurrency of the delay occurrences. This same approach was developed and evolved to accommodate the interrelation between those different classifications as in Figure 3 (Nguyen, 2007). This interrelation added to the classification other dimensions as the contractual enforcement of the liability and recoverability for each case.

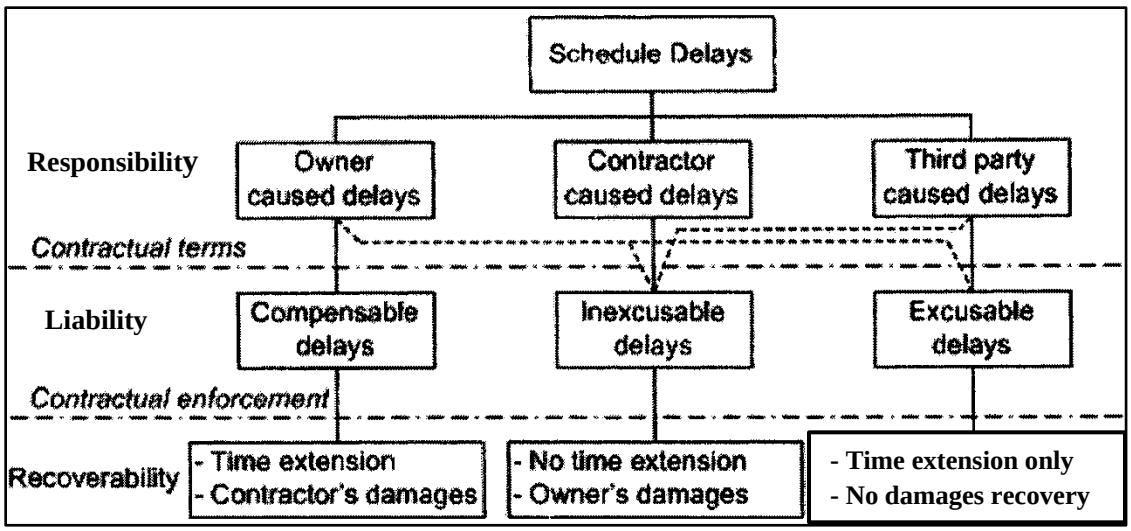


Figure 3. Construction Delay types, (Nguyen, 2007).

The following sections will explain and emphasize the terms of excusable, non-excusable, compensable and concurrent delays in more depth as in the following:

Excusable delays

Excusable delays are delays that are attributable to neither the contractor nor the owner. These delays can be attributable to unforeseen events that are beyond the contractor's control without being a result of any fault or negligence. These events can be acts of god (e.g. floods, strikes), government regulations, or in some cases it is differing site conditions. The recovery of these delays are slightly debated whether it is relieved by granting time extensions solely or it can have some compensability too. However, most of the industry is leaning towards the time extension aspect only.

Non-excusable delays

Non-excusable delays are delays that are attributable and caused by the contractor. These delays are a result of the contractor's actions, inactions, or fault by himself, his subcontractors, or his suppliers. These kinds of delays don't allow the contractor to be entitled for neither time

extension nor any compensable recovery for any delay damages. In the same time, it makes the contractor to go for voluntary enforced acceleration to make up the schedule and upon a contractor's failure to make the schedule, it grants the owner any liquidated damages that are contractually enforced.

Compensable delays

Compensable delays are primarily owner-caused delays. These delays are attributable to the owner or any agent or third party that the owner is responsible for in the contract, which may include but not limited to the architect, engineer, consultants, and others. These faults attributable to the owner can be like, failure to furnish the site on time, incomplete drawings, faulty design or specifications, and others. These types of delays entitle the contractor to a time extension in addition to monetary compensation for delay damages.

Concurrent delays

Concurrent delays are considered the most complicated type of delays. This is because it is a situation where there are two or more types of the above-mentioned delays occur within the same time. It is basically a combination scenario of two or more excusable, non-excusable and compensable delays. Those kinds of delays can be very complex when it comes to the question of recovery, damages, or trying to get an absolute remedy for it. A concurrent delay remedy matrix was introduced as in Figure 4 (Kraiem & Diekmann, 1987).

Concurrent Delay	Remedy (For Critical Path)	
Any delay concurrent with excusable	Time extension	
Concurrent compensable/nonexcusable	Easy-rule Time extension	Fair-rule Apportionment

Figure 4. Concurrent delay remedy matrix, (Kraiem & Diekman, 1987).

Schedule Delay Floats and Criticality

This section will address several issues regarding the schedule floats as in the context of Critical Path Method (CPM) schedules since it is considerably the most nationwide and worldwide used scheduling technique when it comes to construction scheduling. The term critical path method refers to a specific technique of schedule network analysis that is used to determine the amount of flexibility that exists in regards to the scheduling of a particular and specific logical network path with the network of the project schedule (PMI, 2008). These issues are the definition of schedule floats, types of floats, float and schedule criticality relationship, float ownership and the floats effect on concurrent delays.

Floats types and criticality

In CPM schedules, the project duration is determined by the critical path which is the longest path in the project CPM network, including all applicable lags and constraints (Mubarak, 2010). Every activity on that path is named a critical activity where any delay in these critical activities can cause the entire project to be delayed.

The project schedule float is a very complex subject that is hard to be addresses in a simple discussion (Mubarak, 2010). Mainly there are two main types of floats, total float and free float along, with other branching types (e.g. interfering floats, independent float). In general, the

Total Float (TF), or slack, defines the maximum amount of time an activity can be delayed without delaying the whole project, while the Free Float (FF) defines the maximum amount of time an activity can be delayed without delaying its immediate successors. It is obvious from the definitions that the TF is controlling the criticality of a project where it is value is zero for the entire critical path activities in a CPM schedule. However, upon delay occurrences, more critical paths can materialize for the project due to float differences. In other words, the consumption of some activities float can create other critical or near-critical paths in a project schedule which bring one of the most disputed aspects of schedules, "Who owns the float?" (Larkin, 2007).

Float Ownership

Float ownership is largely disputed between the main parties (owner & contractor) due to its value in project scheduling (Kraiem & Diekmann, 1987). The history of court decisions on this problem have been mixed between awarding the ownership to the contractor one time, owner the other, and sharing it between the two parties. However, recently, many court decisions and contracts have begun to lean toward sharing the float between the two parties, by stating that float is ''owned by the project'' and is ''available to whomever needs it first'' (Shumway, Richard & Ritti, 2004). Federal contracting boards of appeal support shared float, and standard contract agreements used by the California Department of Transportation uses a version of shared ownership of float, too (Korman, 2011).

The owner's use of the float mostly comes in the form of change orders that consume and accommodate the float, while the contractors uses the float to control the project, including resource allocation, weather conditions, and as a contingency for unforeseen conditions. The owner's consumption and ownership of float limit the contractor's ability to shift resources and perform his work efficiently and may even put him in a very critical situation where he can

encounter liquidated damages (Householder & Rutland, 1990). This became a reason along with the owner-introduced "float ownership" clauses for the contractor's submission of un-logical schedules where they limit the floats on their schedule so they can preserve some flexibility to their resource utilization without the owner interference (Shumway et al., 2004).

Another interesting scholarly perspective is to align the float ownership with the risk allocation of a project where the party who bears the greatest risk in a project should be entitled to float ownership, and deserves compensation from other project parties who increase the risk associated with the project by consuming the float (Al-Gahtani, 2009). Floats and float ownership simultaneously can become a major issue when it comes to concurrent delays because of the complex nature of this delay's criticality.

Floats and Concurrent delays

The major interrelation of floats and concurrent delays is a responsibility issue, where an owner and a contractor have a concurrent delay (i.e. compensable /non-excusable) but the float consumption was done by only one party. In some of those cases, a fair-rule and appropriation will be very hard to be done. This specific issue hasn't been addressed in its full complexity in recent studies and it can be a future point of research.

Delay Damages

Delays can cause damages to all project stakeholders in general. The main parties that are usually discussed and quantified in research are the owners and contractors. This section is exploring the possible damages to both parties in general. In general, in order for either party to claim damages for delay, the claimant party has to prove causality, liability and quantify the damages from the delay properly.

Owner's delay damages

There are generally three types of owner damages; actual, consequential and liquidated damages. Actual damages in the form of compensation based on the ground of the "cost rule" which measures the costs of incomplete or defective work or the "value rule" for compensating for the difference between the specifications value against a lesser project value provided (Block, 2007). A consequential damage from a delay could be recovered in the form of storage costs, material price escalation, additional interest costs, consultant and supervision costs, and loss of profit (Block, 2007). If the contract is for a public property, the owner's actual damages may include loss of revenue, too, as in the case of Cooperstein v. Patrician Estates (117 A.D.2d 774, 499 N.Y.S.2d 423 (2d Dept. 1986)) where the court found an award of damages to be an appropriate remedy to compensate the homeowners for the contractors' breach of their promise to timely construct a house on the premises and convey it to the rightful owners (Tables of Cases, 1986).

Finally, the most common form of delay damages for owners is found in liquidated damages. Liquidated damages is an amount that both parties set forth in the contract and agree that shall be payable as compensation in the event of a breach, normally due to a contract delay (Tyler, 1994). Liquidated damages are the most used form of delay damages used in road construction projects by most of the state DOTs (e.g. CDOT). It is also worth noting that it is normally ruled invalid if the liquidated damages are accompanied by actual and consequential damages clauses, since it can overlap and inflate the compensation value (Last, 1997).

Contractor's delay damages

Contractor's delay damages are way more complex than the owner's damages and are really harder to assess and price, and the process can be very frustrating (Overcash & Harris,

2005). The contractor's delay damages are similar to delay costs that were explained earlier where it is mainly direct and indirect recoverable damages.

Direct damages account for the delay direct impact on project costs as in mobilization, site overhead, idle equipment downtime, and other, while indirect costs refers to the indirect impact including lost productivity, home office overheads, and other. A more comprehensive picture is shown in a form of a cost break structure (CBS) in Fig. 5 (Overcash & Harris, 2005). More on the direct and indirect costs of recovery details and calculation methods will be explained in a later section.

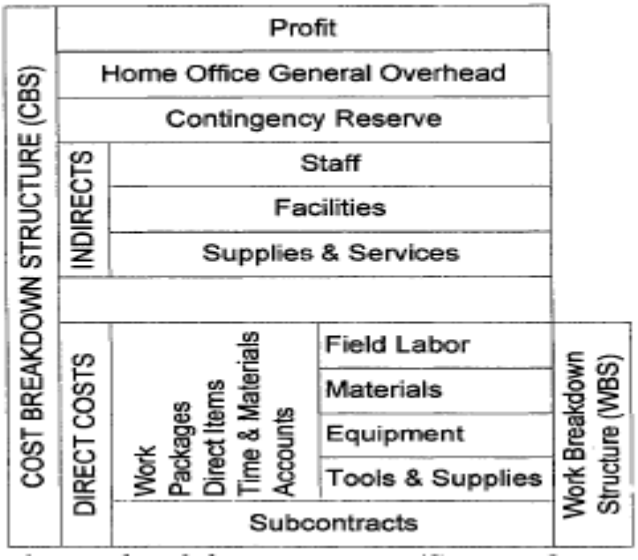


Figure 5. Typical Project Cost Breakdown Structure, (Overcash & Harris, 2005).

Cost and Time relationship

Cost and time interact throughout any construction project cycle. Cost and time baselines are set during the preconstruction, planning and procurement phases in the form of a schedule as a baseline for time and a (Bill of quantities) BOQ or other as a baseline for cost depending on the type of contract. Cost and time should be monitored and reported throughout the project and

ideally, the project can finish within the schedule and the cost “Budget” set forth in the BOQ totals.

Project construction costs are mainly material, labor, and plant cost along with administrative costs. Material costs are normally easy to quantify, predict and control while the labor and plant costs are harder and very different. This is because the material costs are mainly dependent upon the quantity of work while labor and plant costs have a major time component which is linked to the duration they are required on site to finish such work. This duration (time) is impacted by a lot of other factors such as timing and sequence of other work, working space, working hours constraints, resources availability, continuity of work, weather conditions, level of variations, interruptions and above all delays (McGowan, 1994).

The same case for road construction projects where there is always an optimum cost-time balance point where the construction costs of the contractor are minimized, and it can increase if any variation in time occurs. If the construction time from this point reduced like in the case of acceleration due to delay occurrences, the direct costs will increase while the indirect cost decrease and vice versa (Shr & Chen, 2006). This is the main reason of the complex but definite relationship between the cost and time in the case of delays and delay damages that is almost always require a monetary compensation along with the time extension or required acceleration. This cost-time relationship in claims in general and in delay claims in specific urges the need for simple models and frameworks to integrate the time and cost components in order to effectively analyze and fairly compensate for the cost and time effects of variations, delays and disruptions (McGowan et al., 1992).

Different Methods for Claims analysis and Management

This section will demonstrate the different methods and tools that are applied for claims analysis and claims management for both cost and delay claims. This analysis and tools will address claims, direct and indirect cost calculations, schedule and CPM analysis techniques, and productivity loss analysis techniques and methods. Finally, different practice models and simulation techniques will be explored.

Overview of claims quantification parameters

After causality and liability of a claim have been established, the quantification of the claim becomes the next big challenge, since it can be a very complex and tedious process because of the many parameters that have to be considered in calculating a claim's damages or compensation values.

Most of parties (contractors or owners) focus on the entitlement part of the claims at least in the earlier stage of the claim. However, a damage and quantification analysis can be as important or even more important (Schwartzkopf, Mcnamara, & Hoffar, 1992). This because of the fact that early quantification and analysis, especially on the contractor's side, can provide a more detailed and solid accounting record and may avoid further complication of the problem at hand. It also allows selecting the appropriate and accurate estimating methods for those claims.

The possible parameters that affect the claim itself can be a lot as was expressed in the delay claims causes section earlier. However, the parameters and components within the project can be and have to be identified for the future quantification. These components for a claim can be preliminarily identified as shown in following (Cushman, Carter, Gorman & Coppi, 2001; Schwartzkopf et al., 1992):

- Labor costs
- Equipment costs
- Material costs
- Site overhead
- Home office overhead
- Bond and Insurance costs
- Profit Losses
- Interest
- Attorney's fees and claim preparation costs

Most of the above components are included in the context of direct costs, indirect costs and productivity losses which their quantification methods will be thoroughly discussed in the following sections. The following sections are an extensive literature review of several construction industry practices, acts, scholarly literature and reports.

Direct Costs

Labor costs

Direct labor cost can be generally defined as "any labor cost that can be identified specifically with a final cost objective" (DPAP, 2013). Labor costs can include a lot of different types of costs including the hourly wage of the employee, all employer- paid taxes, Social Security, insurance, vehicle expenses, and any employee benefits, workers' compensation insurance, liability insurance, auto insurance, paid holidays, vacations, medical benefits, education, employee meetings, cell phones, pagers, and every other labor-related expense (Mccadden, 2006). Most of the labor cost components in a claim are attributed due to direct labor overrun or productivity losses. Direct labor overrun is defined as the additional hours exceeding the amount originally estimated for the work performance (Schwartzkopf et al., 1992). The reasons behind the direct labor overrun return to several reasons that the claim can be based on

such as additional scope of work, owner-caused delays, acceleration or disruptions. Such additional hours have to be calculated as accurately as possible to be compensated for. The productivity loss aspect will be explained and examined thoroughly in a later section.

Determination of additional hours

The determination of additional hours is linked directly to the accuracy of the cost records where the additional labor hours can be calculated from the daily labor reports and cost accounts. However, in some cases it is very difficult when a contractor is having multiple change orders, several and concurrent delays. In some of these cases, the total cost method for calculation can be allowed where the contractor can seek the difference between the actual and anticipated costs to the disputed scope of work.

Calculation of Wage Escalation

Escalated wages can be a very sensitive cost component in a claim if it exists since it is directly linked to the risk allocation of the contractual agreement. Escalation may include increased taxes, fringe benefits and all other labor burdens and expenses mentioned before (Bramble & Callahan, 2011).

In most contracts, the contractors bear the risk of wage escalation. However, the claim can still arise if the contractor will pay higher wage rates due to owner-initiated delays, change orders and additional work that can extend the risk bearing beyond the time anticipated for that risk to occur. Simply, it is a time schedule issue. To claim for that cost component, the contractor has to compare and emphasize on the difference between the anticipated and actual man-loading schedule to point out the windows of time where the labor hours occurred and link it back to the accrued owner-caused delay, change order or additional work. Wage rates can be determined and compared to the anticipated contractor's original estimate and other tools can be used for

escalation calculation like the Employment Cost Index (ECI) which is a "quarterly measure of the change in the cost of labor, free from the influence of employment shifts among occupations and industries. The compensation series includes changes in wages and salaries and employer costs for employee benefits" (BLS, 2008).

Equipment costs

The equipment costs component to a claim depends on the type of acquisition of that equipment, whether it is owned by the contractor, rented or leased. In the case of the contractor owning the equipment, the equipment cost is divided into two main components; ownership costs and operating costs. The ownership cost is considerably incurred regardless of the equipment use while the operating costs are only incurred by using the equipment.

The ownership cost of equipment includes the purchase expense, salvage value, depreciation costs, major repairs and overhauls, property taxes, insurance, storage, and others. The operation cost of equipment includes fuel, lubricants, filters and grease (FOG), repairs, tires and replacement of high wear tires (Peurifoy et al., 2010).The U.S. Corps of Engineers, for example, uses a regional established methodology for calculating the hourly rates of equipment ownership and operating costs (USACE, 2008).

The increased equipment costs incurred on a construction project, and specifically in equipment-intensive infrastructure project, are due to the following reasons (Schwartzkopf et al., 1992):

1) Extended performance periods requiring the equipment to be on the project site for longer periods of time.

2) Additional work requires the equipment to work for longer durations than anticipated or adding more equipment to perform.
3) Productivity losses for equipment due to owner caused delays or disruptions.
4) A combination of two or all of the above.

Additional Work

The determination of additional equipment working hours is done by simply comparing the original estimated equipment hours with the actual usage. Again, the contracting cost accounts records for each unit of work is very important along with the operator logs to be able to calculate the fair compensation for these extended additional equipment hours.

In the case of adding additional equipment to complete the work due to an owner-caused acceleration or additional work, the costs of mobilization and demobilization should be accounted for. It is also worth noting in the case of rental equipment, the costs to be accounted are the rental rates in addition to the operation costs of the equipment.

Idle /standby Costs

Idle or standby costs are mostly claimed by the contractors, and are associated with delay claims when they have the equipment idle onsite because of an owner-caused delay. In those types of claim components, the contractor has to identify what equipment was idle for how much time and the cost of that equipment. However, the time estimation of how long it was idle can be very complicated to calculate due to the fact that sometimes the equipment may have worked on a change order work or out of the sequence of the contracted work (Rannestad, 2011). In some cases though, it can be as simple as the idle time exactly equals the delay time.

The cost of idle equipment is only the ownership costs since there are no operating costs encountered during the idle time. The only dispute in the industry regarding the idle costs is the

depreciation costs accompanied with the standby state of the equipment. The first opinion is that there is no depreciation cost when equipment is idle because it is not wearing out, while the second opinion is that the depreciation costs are still incurred due to the progress of the equipment to obsolescence in value from the time value of money perspective (Rannestad, 2011).

Material Costs

The costs of material is not as complicated as other cost components of claims since it is mostly allocated to certain type of work packages that can be easily allocated and identified. "The three most common reasons for material claims are; owner caused delay, defective specification and owner-directed damages" (Schwartzkopf et al., 1992).

Material costs recoverability scenarios

There are three different scenarios mentioned above. The costs of material that can be attributed to the owner-directed changes or any additional work can simply be quantified from the changed or added scope of work. The same theory goes for defective specifications where the contractor has to comply with corrected specifications that can add cost items or substitute an item with a more expensive one. In the case of owner caused-delay however, it is a matter of cost escalation of the material that shouldn't have happened if the delay didn't exist. This is similar to the wage escalation issue discussed earlier with similar kind of analysis to prove it and claim its compensation value. It is also worth mentioning that the price escalation issues that can arise with the owner-caused delay is almost similar to the wage escalation, too.

Transportation and Storage costs

Transportation and storage costs can occur in case of defective specifications, changes or additional work, where the contractor has to add or substitute materials, and may be required to

store them in some cases. In the owner-delay cases, it is more about the storage costs rather than the transportation expenses.

Indirect Costs

Site Overhead (SOH)/General Conditions Costs

Construction site overhead often referred to as "General conditions" because the contractor site management usually operates as required by the general conditions of the contract (Irwin II, 2005). These general conditions and site overhead costs include but are not limited to office trailers, fences, storage warehouses, office equipment and supplies, temporary utilities, communications, sanitary facilities, service trucks and cars, site personnel, project managers, and superintendents. Site overhead can be claimed for recovery due to additional work, owner-caused delays or an owner-directed acceleration. For example, an owner directed acceleration that requires shifts, weekend work and extra supervision.

Site overhead claim quantification methods

Site overhead quantification methods can be as simple as the daily period daily rate method (Lankenau, 2003) as in the following equation:

$$\frac{Total\ Time\ Dependent\ Costs\ to\ Date}{Project\ Duration\ to\ Date} = Fair\ Daily\ Rate\ for\ Delay\ Period$$

Then, the site overhead claim can be calculated as the product of the delay period and the daily rate output of the above equation. This method is purely dependent on the time of the delay which can be possible in the case of one clear compensable-delay. However, in the case of concurrent delays where it is related to certain activities within the schedule, this method cannot be very accurate for the site overhead compensation claim and it can be argued against in a court of law. Another study tried to account for the timing of the delay to fairly calculate the overhead

costs based on the schedule activities by considering the context of a delay in term of timing during the project. This was done by tracking the site overhead in a "real time" manner and using the schedule-window analysis method to analyze the delays at hand (Ibbs & Nguyen, 2007a).

Home office overhead (HOO) Costs

Home office overhead costs are indirect costs that account for a number of head office expenses, including but not limited to home office salaries, supplies, utilities, rent, software and computer staff, association dues, travel, and others (Darbyshire, 1982). Home office overhead can be recovered upon the extension of the contractual duration primarily because of an owner-caused delay. Several conditions have to be provided for a recovery proof. Some stated in the Texas Department of Transportation (TDOT) guide as in the following (TXDOT, 2009):

- The project was delayed by excusable and compensable impacts.
- The contractor was effectively on standby during the delay. Contractors' crews and equipment remained at the project site while the problem was being resolved.
- The contractor was unable to take on other work, on or off the project, during the impact.

Extended vs. Unabsorbed HOO

In the construction industry, the extended home office overhead is based on the extension of the contractual period while unabsorbed HOO referred to a specific situation where an owner caused delay limit the contractor from taking on other projects which can absorb the overhead costs (Schwartzkopf, 1992). The General Services Board of Contract Appeals (GSBCA) has identified that the extended overhead is a concept unique to the construction industry and defined the unabsorbed overhead as the result of the allocation rate of indirect costs to the scope other than the delayed or disrupted scope so that the owner-caused delays which reduce the number of contracts that a contractor can take on may give him the right to claim for the unabsorbed

overhead costs (Capital Electric Company, 1984). It is worth noting that the Construction delay claims regarding extended overhead are among the most complicated claims and the most disputed claims all around the construction industry in general and in the road construction specific due to the high overheads associated with the road infrastructure jobs (Rodriguez, 2013)

Different Methods for HOO Calculation

There are several quantification methods for HOO claims. The most well-known formulas are the Eichleay formula and the Hudson formula. A lot of other methods including but are not limited to direct method, Enstrom formula, Manshul formula, Carteret formula, Allegheny formula and Emden formula (Zack, 2001).

Eichleay Formula:

The Eichleay formula is considerably the most discussed, applied and critiqued formula for HOO calculation (Ernstrom & Essler, 1982). The formula is named after the case where it was first used: Eichleay Corp., 60-2 BCA 2688 (ASBCA 1960), where the Board of Contract Appeals (BCA) awarded the contractor HOO expenses as part of the compensation of the delay damages. The original Eichleay formula that has been used in that case in 1960 is as in the following equations.

$$\frac{\text{Contract Billings}}{\text{Total Billings for Actual Contract Period}} \times \text{Total Company Overhead During Actual Contract Period} = \text{Overhead Allocable to Contract}$$

$$\frac{\text{Allocable Overhead}}{\text{Actual Days of Contract Performance}} = \text{Overhead Allocable to Contract/Day}$$

$$\text{Daily Overhead Rate} \times \text{Days of Owner-Caused Delay} = \text{Home Office Overhead Owed}$$

Since then, there have been 2 modifications known as Modified Eichleay-variation 1 and Modified Eichleay-variation 2. The Eichleay formula has been accepted across courts and board

decisions and has been set as prerequisite criteria until today (Taam & Singh, 2003). However, the use of the Eichleay formula has been widely criticized and doesn't always guarantee a compensation for the claim. One of the scholarly critics stated five reasons behind the deficiency of the Eichleay formula's use as in the following (Lubka, 2005):

1. That there is a lack of evidence of damages. That the damages are awarded simply as the result of the presumption that by making a prima facie case, that such damages exists.
2. That the damages only exist to the extent that there is an actual delay in the project. Increased overhead resulting from a breach that does not result in a project delay does not yield damages.
3. That if the government simply provides a date of resumption of work, that there is no uncertainty with regard to the delay and damages is precluded.
4. That the concept of "stand-by status" is still uncertain and that the extent to which a contractor can perform work without impairing its Eichleay rights is not well defined.
5. Situations of where there is a suspension, followed by a termination.

Hudson Formula

The Hudson formula is another established HOO calculation method that is widely used in England where it is derived from the Hudson's Building and Engineering Contracts. The formula derives its daily head office overhead rate on the basis of the as-bid calculations and assumes that the bid rate should hold constant throughout the life of the project as shown in the following equation (Hammer, 2008):

$$\text{Planned Home Office Overhead \& Profit \%} \times \frac{\text{Original Contract Sum}}{\text{Original Contract Period}} = \text{Allocable Overhead Per Day}$$

The Hudson formula is mainly criticized because of its adoption of the HOO as a percentage from the contract as the factor for calculating the costs which can hold a little or no relation to the actual head office costs of the contractor (Molloy, 2001; Winter, 2001).

Bond and Insurance Costs

Bonds are mostly a requirement on private projects and an obligation on any public project where the Miller Act (Ch. 642, Sec. 1-3, 49 stat. 793,794, codified as amended at 40 U.S.C. §§ 3131–3134 (formerly 40 U.S.C. §§ 270a–270d)) requires general contractors on government construction contracts to post bonds to guarantee the performance of their contract and the payment of their subcontractors and material suppliers (Libor, 2001).

Reasons for bond and insurance claims

The contractor claims for bond &/or insurance costs can be triggered by two main events. The first event is the owner-directed changes that can increase the monetary value of the contract which will require the contractor to incur more bond premiums and add more insurance costs. The second event is the owner caused delays that can extend the contract duration and value where again, the contractor will incur additional bond and insurance costs.

Calculation of increased costs for Bond premiums

The calculation of the additional costs for bond premiums can be done directly or indirectly. The direct method is by calculating the bond premiums based on the contract value of the work by calculating the increased bond costs based on the increase on the contract amount along with the additional premium for the contract duration if a delay exist. The indirect method is by marking up the equitable adjustment by a certain percentage should it be mentioned in the contract provisions (GSA, 2009; USACE, 2008; Schwartzkopf et al., 1992).

Reasons and calculation of increased insurance costs

The reasons behind the claims for the increased insurance costs are the same two reasons for the increased bond premium costs; owner-directed changes and the owner caused delays that can extend the contract duration where again, the contractor will incur additional insurance costs. The calculation of the increased insurance costs is simple. It is simply the amount insurance costs incurred in the additional contract time due to that delay or added work.

Profit Loss Costs

Lost profit claims are categorized into three deferent categories: Profit on additional work performed, profit on unperformed work and lost business revenue (Schwartzkopf et al., 1992). The profit on additional work isn't usually disputed since it is easy to calculate as a percentage that is set forth in the contracts for any additional work or change orders. The other two categories are the most disputed and hardest to prove because of the fact that it requires proof of something that never happened in real time which makes it a very uncertain dispute (Mcfarland, 2013).

Profit on unperformed work

The claim for unperformed work is always associated with contract breach where the contractor is now losing profits that would have been generated had he been allowed to perform the work as anticipated in the contractual agreement fulfillment. Most of these claims are denied because of the difficulty of proving them, and possibility of exaggeration at times. However, profit on unperformed work may be claimed under certain factors as summarized in the following (Pollack, Bouchner, Enos, Johns, & Moyl, 2006):

- The wrongful act of the defendant caused a loss; and
- The amount of the loss can be estimated with reasonable certainty.

- The plaintiff must show that the loss incurred was foreseeable at the time the contract was entered into by the parties.

The profit of unperformed work is straightforward when it comes to fixed-price contracts where the profit loss computation is as in the following:

Profit Loss compensation = Contract price - Progress payments received - cost of completion.

This formula can be applied when a contractor has performed little or no work under the contract as in the City of Lawrence v. Falzarano Construction Co. (402 N.E.2d 1017 (Mass. 1980)); CCM July 1980, p. 3. It can also be applied when a contractor has performed substantial amounts of work prior to a wrongful termination. Green Island Contracting Corp. v. State of New York 9473 N.Y.S.2d 55 (N.Y.A.D. 1984); CCM June 1984, p. 3 (Construction Claims Monthly, 2000).

Another traditionally used method is calculating the difference between the actual cost of performance of the scope and the amount the contractor would have been paid had he performed the contract taking into account reasonable rate of returns and profit margins.

Lost Business Revenue

Claims for lost business revenue are usually associated with the bonding capacity issues. It is considered a consequential damage resulting from a contract breach, where the contractor suffers loss of profits on collateral business arrangements and the revenues that could be generated as a result (Nicolich, 2012). A recent Colorado Supreme Court decision in Denny Construction, Inc. v. City and County of Denver, Colorado (199 P.3d 742 (2009)), decided that a terminated contractor may recover future profits on future projects as a result of the loss of bonding capacity arising from a wrongful termination (Cull & Travers, 2009).

A recovery for lost business revenue claim associated by the lost bonding capacity has to establish the following (Schwartzkopf et al., 1992):

1- The contractor's ability to bid for public jobs was limited as a result of lost bonding capacity
2- The contractor had work upon which to bid
3- The contractor was likely to be awarded one or more of those contracts that he lost the ability to bid on because of the lost bonding capacity

It is worth mentioning that different states have different rules for recovery of lost profits in different situations, and many impose a high burden of proof to meet the "reasonable certainty standard" which is not a definite standard between courts either (Wylie & Fahy, 2007).

Interest Costs

In construction claims, interest is a substantial component. This is because of the fact that by the time the claim comes to trial or recovery; it can be one of the largest components in a claim. Interest claims are usually accompanied with the cost to finance the project performance by borrowed funds mainly for extra and changed work (Ramsey, 2007). In other words, it is the interest of the borrowed funds as a cost of performance. Interest as a claim component can be claimed as one of the following categories (Davenport, 2006):

1) Under a provision in the contract
2) Under a provision of an agreement for arbitration or expert determination
3) Under statute
4) As damages

Interest on borrowed funds as a cost of performance

The interest on borrowed funds for performing added work or a change order issued by the owner is generally recoverable as in Havens steel Co. v. Randolph Eng'g Co. (613 F.Supp.514 (W.D Mo. 1985)). The key factors for quantifying such claims are to determine the period over which the interest is computed and the interest rate to be calculated against (Libor, 2001).

(Imputed interest)

Imputed interest is the compensation for interest resulting from the contractor financing owner-caused change, added or delayed work from his own capital's equity. The claims here can be considered a damage recovery on interest known in courts as "Hungerford interest" damage. The Hungerford interest is the interest that the contractor could have earned on his equity and instead he used it to perform additional and changed work for the owner (Davenport 2006).

It is worth mentioning that federal courts subject to the Federal Cost Principles don't allow the recovery of interest on borrowed funds as a cost of performance while the Board of Contract Appeals (BCA) have allowed the recovery of imputed interest (Schwartzkopf, 1992).

Attorney's fees and Claim preparation cost

The claim for attorney's fees and claim preparation costs is dependent upon the contract provision set forth between the parties. However, under federal construction contracts, contractors and owners may be able to recover those fees according to the Equal Access to Justice Act (EAJA) that allow the payment of attorney's fees to a prevailing party (28 U. S. C. §2412(d)(1)(A). Section 2412(d)(1)(B)).

Schedule and CPM Analysis Techniques

Schedule analysis is the process of evaluating schedules by evaluating the magnitude, impact and significance of the variation between the baseline and operating current schedules

(Majerowicz, 2001). The schedule impact analysis can also be defined as the process of quantifying the effect of delays or changes impacts on a project schedule (Arcuri, & Hildreth, 2007; Henschel & Hildreth, 2007). In this section, different schedule impacts and CPM analysis techniques will be demonstrated as tools for analyzing delays, which is a very essential part of any successful delay claim. There is a lot of literature examining different methods. However, the following sections will explore the most well -know methods and the most used in practice such as As-planned vs. As-built method, Impact As-planned, Collapsed As-built, Time Impact Analysis and Schedule window Analysis.

As-Planned vs. As-Built Methods (AP vs. AB)

This method is also known as "total time method" or "net impact method". Basically, AP vs. AB is an analysis method that compares the as-built schedule to the as-planned one where the difference between the two schedules is considered the recoverable delays. It is an inexpensive, simple and easy method to use. However, this method isn't practical since the amount overestimating the duration of the delay considering it is all from one party (Alkass, Mazerolle & Harris, 1995; Stumpf, 2000) and it is a complete failure when concurrent delays encountered.

An advanced version of this method is called "modified total time" method which goes a little further by identifying the categories of delays as owner, contractor or third party-caused delays which yield a little more reliable results (Nguyen, 2007; Stumpf, 2000).

Impacted As-planned Methods (IAP)

This method is also known as "what-if" or "adjusted-baseline". This method is trying to address the delay responsibility by using the original CPM As-planned schedule and insert into that schedule the party delays that impacted the schedule (Trauner, 2009). Apparently, this method is more reliable than the (AP vs. AB) method but it still fails to address the concurrent

delay issue. It is also assuming that that as-planned schedule was reasonable which is “almost always impossible in the real world” (Nguyen, 2007).

The deficiency of the IAP method can be summarized as in the following (Trauner, 2009):

- The impacted schedule does not show the project activities as they occurred
- The decision of placing the impacts into the schedule is greatly subjective
- The method does not reflect the dynamic nature of construction project and the critical path

Collapsed As-built Method (CAB)

This method is also known as “what-if”, “but for” and “adjusted-baseline.” In contrast to the IAP method, this method tends to prepare a detailed As-built schedule including all known delay events, then removes the delay of one of the parties which will impact the new end date, then illustrates how the schedule would have progressed but for those delays (Lovejoy, 2004). In other words, the differential duration between the as-built and the collapsed end dates represent the delay caused by those subtracted activities that have impacted the schedule.

This method has been accepted by the construction industry and it has the ability to address the concurrent delays and assess their types by removing the owner and excusable delays for the as-built schedule (Arcuri & Hildreth, 2007). It has been utilized by the BCA (Lovejoy, 2004; Nguyen, 2007). However, there are several weaknesses associated with this method as it base the CPM network on as-built information where it can be tweaked and manipulated to a predisposed conclusion.

Schedule Window Analysis

This method is also known as “snapshot method” or “contemporaneous period analysis.” In contrast to the other methods that analyze the whole schedule at once, this method’s name

"snapshot" is derived from analyzing specific time periods within the schedule. This method uses the as-planned schedule as its baseline and divides the total project duration into smaller time period "windows" that specify major milestones, significant modification in the critical paths or major delays and revisions. Then it analyzes the delays occurring in each window successively within the critical paths that exists in the schedule and accounts for their variation throughout the analysis (Hegazy & Zhang, 2005).

There are several versions and variations of the window analysis methods such as (Kao & Yang, 2009):

- Modified window analysis
- Delay analysis method using delay selection
- Daily windows delay analysis

The main strengths of this method is that it utilizes up-to-date information to account for the variation in critical activities and paths reflecting the actual status of work and assess each period for delay, causation and responsibility (Nguyen, 2007; Zack, 2001a). Courts, boards, practitioners, and research scholars have agreed that the window analysis is one of the best available options (Hegazy & Zhang, 2005; Ibbs & Nguyen, 2007b; Kartam, 1999; Stumpf, 2000). However, there are several weaknesses to that method in its traditional version as in the following (Hegazy & Zhang, 2005):

1. The as-built schedule with it's after the fact nature, may be subjected to errors and omissions that hinder accurate delay analysis.

2. The window span being in the form of weeks or months, the focus is on the critical paths that exist at the end of the window time. Thus, the technique does not consider the fluctuations that occur in the critical paths as events evolve on site.

3. As a consequence of the above point, the technique loses sensitivity to the time at which the owner/contractor causes project delays within the window. Also, it loses sensitivity to the events of speeding or slowdowns within the window.

4. The delay representation of existing software systems makes the application and automation of the windows technique a difficult task.

Time Impact Analysis (TIA)

Time Impact analysis is one of the reliable analysis techniques and yields the most reliable analysis results (Arditi & Pattanakitchamroon, 2006; Nguyen, 2007). This method can be considered an advancement of the window analysis method where the difference is that the TIA focuses on a specific delay or delay activity in contrast to the window analysis the focus on time periods or a snapshot of the schedule (Alkass, Mazerolle & Harris, 1996). This method works by using the as-planned schedule, and updates it instantly as soon as any delay, change or disruption calls for a schedule impact analysis in a very actively real-time manner. This is accompanied with realizing all the CPM network changes and variations when the event occurs. These variations can be critical path shift, float consumption, or new interrelations where all impacts are analyzed, revised, and reflected in the as-built schedule (Arcuri & Hildreth, 2007).

One of the major benefits of this method is that it provides a disciplined basis for the contractual parties to keep an updated project schedule (Wickwire, Driscoll, Hurlbut & Hillman 2003). The main drawback of this method is that it does not immediately deal with the

concurrent delays (Alkass et al., 1996). It also requires a lot of effort and accuracy of the daily records and it can be very effective given that the impacts are being inserted in a real-time efficiency.

Other Methods and Techniques for schedule analysis

There are several other techniques and methods for schedule analysis, where most of them are improvements to the methods mentioned above. A computerized delay claim analysis (CDCA) utilizing the isolated delay type (IDT) by using an expert system tailored to the specific expertise of construction claims to facilitate the decision making process was introduced in 1995 (Alkass et al., 1995). Another method was introduced as "construction delay computation" that is not based on the CP analysis but can be integrated into any delay analysis system to further improve and automate the construction delay analysis process (Shi, Cheung & Arditi, 2001). In 2005, a method was presented as a fuzzy logic model that integrates daily site reporting of activity progress and delays, with the schedule to develop and assist in the analysis of the effects of delays on a project's completion date (Oliveros & Fayek, 2005). In 2007, a resource allocation approach was introduced to the schedule analysis where the effect of resource allocation controls the severity of some delaying events to enhance the window analysis technique (Ibbs & Nguyen, 2007b). Another new schedule analysis technique was introduced as "FLORA" as in Forensic Schedule Analysis Technique where it can control the float dynamics, logic along with the resource allocation in the analysis (Nguyen & Ibbs, 2008). These methods mentioned above along with others incorporate several modifications to the schedule analysis techniques. These methods have been reported in multiple research literature including but not limited to "improved but-for analysis" and "daily window analysis" (Hegazy & Zhang, 2005; Mbabazi, Hegazy, & Saccomanno, 2005).

Productivity Loss Analysis Techniques & Methods

Productivity losses are claimed when it is a result of change orders, added work, acceleration, disruption, changed conditions and owner-caused delays in a project. The causes that contribute to the productivity loss have already been discussed before in the change section as root causes for claims. Many methods for estimating lost labor productivity are available in many forms as in grouped into project-specific studies, project comparison studies, specialty industry studies, general industry studies, cost basis, and productivity impact on schedule (AACE, 2004).

This section will review and explore different available techniques and methodologies to quantify the impact of productivity loss. This section will also complete the picture of the direct costs accrued in a claim, as the productivity loss is one of the components of direct costs to be claimed as labor and equipment lost productivity costs.

Total Cost Method

Total cost method is the simplest, the most basic and easiest method. This method simply calculates the difference between the estimated labor &/or equipment costs and the costs actually incurred, including profit to arrive at the recoverable (Jones, 2001) amount. It is simply as “I bid $X for labor and I spent $Y and you owe me the difference” (Burke, 1991). Most of the courts are reluctant to accept this method since it can be mostly inaccurate and exaggerated. The reasons behind its inaccuracy and exaggeration are that it assumes that all the fault of contribution to the losses is initiated from one party and that the bid estimate is flawless. The acceptance of the method is controversial and is limited to satisfying a four-part test as enunciated by the Court of Claims in Boyajian v. United States (191 Ct. Cl. 233 (1970)), as in the following rare conditions (Guevara, 2013):

1. No other practical means of measuring the damages are available in the case,
2. The contractor's original bid was reasonable,
3. The contractor's actual costs were reasonable, and
4. The contractor isn't responsible for the added cost in any means.

Modified-Total Cost Method

As the name indicates, it is another version of the total cost method. It is modified to mainly cure the two most significant drawbacks of the total cost method that are: (1) not considering the problems caused by the contractor and (2) assuming that the contractor's bid is flawless. The modified method tries to account for some adjustment by accounting for the faults of the contractor and the original bid such as bid errors, costs arise from the contractor's actions or other third parties (Silverberg, 2003).

Such modifications make this method more favorable in courts. However, the same four requirements mentioned before as in the case Boyajian v. United States (191 Ct. Cl. 233 (1970)) still need to be satisfied (Schwartzkopf & Mcnamara, 2001).

Jury Verdict Method

This method can be used when there is an undisputed proof and entitlement to damages and causation by the damages due to the lost productivity cannot be estimated accurately by any available methods or techniques. In this case, the jury arrives at reasonable amount based on the portions of inconclusive evidence that was presented during the hearing (Caplicki III, 2003). In order for the jury method to be applied, the following three requirements have to be fulfilled (Lee, 2007):

1) Clear proof of injury,
2) Absence of a more reliable method to calculate damages, and

3) Sufficient evidence for a fair and reasonable approximation of the damages.

Baseline Method

The Baseline method, just like all the above mentioned, relies on the contractor's bid estimate. Instead of taking into account the whole contract value like the total cost method, it selects only the impacted activities which are considered the most significant cost items based on the Paretto's principle (Barrie & Paulson, 1992). This method is considered a more reliable method than the total cost method, but it requires a lot of documentation to prove the reasonableness of the contractor's bid estimate (Abdulmalak et al., 2002).

Actual Method

It can be also known as "Segregated Cost Method" or "Discrete Cost Method." This method depends solely on the absolute accuracy of the contractor's records. This is because it is performed by a very detailed analysis and itemizing the cost of each piece of equipment and labor influenced by the owner caused action or inaction that was the reason of loss of the productivity (Schwartzkopf &McNamara, 2001).

If a contractor has to use this kind of method, he has to prepare with every single piece of detailed records so he can adequately compensated. This method is highly favored by courts because of its level of detail, reliability and accuracy. However, it is very difficult to keep such detailed records, and it needs a great amount of time, cost, and effort to achieve as recognized by the Veterans Affairs Board of Contract Appeals (VABCA), which states "We have recognized that maintaining cost records identifying and separating inefficiency costs to be both impractical and essentially impossible (Centex Bateson Construction Co., VABCA4613 et al., 99-1 BCA ¶ 20513" (Jackson, LaFraugh & Majerus, 2001; Lee, 2007)).

Measured Mile Analysis Method

It is also known as “Modified Baseline Method” or “Estimated Cost Method.” This method quantifies the lost productivity due to disruption by comparing the productivity during the impacts versus non-impacted periods of the project (Finke, 1998). The difference between the two period’s productivity is considered the productivity loss. M.R. Finke stated that five pieces of information have to be identified to be able to use this method as in the following (1998):

1) The identification of the scope of disrupted work,
2) The identification of the un-impacted time period,
3) The identification of actual; productivity during the impacted period,
4) The identification of the impacted time period, and
5) The identification of actual productivity during the impacted period

The measured mile is considered the most widely accepted and credible method used to calculate costs resulting from lost productivity (Guevara, 2013). This is because it considers only the actual effect of the alleged impact and thereby eliminates disputes over the validity of cost estimates, or factors that may have impacted productivity due to no fault of the owner (Schwartzkopf and McNamara, 2001; AACE, 2004). However, the greatest challenge lies in “identifying an unimpacted period in which the work being performed was sufficiently similar to that work performed in the impacted period” (Jones, 2001).

Other Methods (Factor-Based) and (Disruption Distribution)

Factor Based Methods is methods that apply “lost efficiency factors” towards the original estimate of the production unit required (e.g. man-hours) for the affected activities and the difference between the applied and the original units can be claimed (Abdul-Malak et al., 2002).

These factors are created based on changed work conditions, historical data and expert opinion which can be found in industry publications graphs (Kallo, 1996). Another way to calculate those efficiency factors is according to “forward-pricing formulas” that establish the relation between total impact of changes to factors such as float, timeliness of notice to proceed (NTP) and the monetary value of the changes made (Kasen & Oblas, 1996).

Several disadvantages of the factor-based method were identified as in the following (Abdul-Malak et al., 2002):

1) The factors used are highly speculative and require substantial supporting documentation.
2) There are no activity specific sets of factors, but rather factors for the project as a whole.
3) Even if such factors were to be developed, they would still need calibration to reflect the peculiarities of the project and the contractor work force.

One more method called “disruption distribution” is introduced, which models the relationships between activities using quantitative and qualitative factors, which are derived from specific circumstances and project characteristics, and it works by starting with the work activities directly affected and then distributing the disruption to other activities. However, the suitability of such models to a particular project remains to be doubted, and they are hence more suitable as guiding references. If it is conducted in a timely manner, they also allow the contractor to utilize the available float to mitigate the effects of the disruption by rescheduling of activities, reassigning crews, and so on (Abul-Malak et al., 2002; Finke 1998).

Models and Simulation Techniques

Simulation models and techniques can increase the efficiency and the capability of claim analysis in general and the productivity losses in specific since it allows to focus on the activities

individually and can simulate different resources that are involved while portraying the sequence of the schedules to provide a more realistic and holistic approach in analyzing the claim analysis.

Scholars have discussed some of the most significant advantages of simulation as in the following (AbouRizk & Dozzi, 1993):

1) the ability to carry out sensitivity analysis
2) It allows the estimation of the effects of disruptions.
3) It incorporates the uncertainty involved in construction and models the complex nature of resource interactions.

It is also worthy to mention that the above simulation techniques is best suited with certain techniques such as a computerized simulated disruption distribution.

There have been several modeling techniques and models. One of the most dominant simulation techniques in resolving construction claims and disputes is the “CYCLONE Model” The cyclone model works within several condition as in the following (AbouRizk & Dozzi, 1993):

1) The operation should be of a cyclic (repetitive) nature
2) The operation should be easy to model, and the mediator should have extensive knowledge in the field in order to construct a useful model;
3) The disputing parties should have the right mind-set to accept the implementation of this technique
4) The parties should have access to easy-to-use simulation software, such as the Micro-CYCLONE simulation system.

This model has been used in several cases that are not limited to the erection of a steel bridge in Alberta, Canada (AbouRizk & Dozzi, 1993), and another analysis for productivity on a tunnel operation (AbouRizk, Manavazhi & Dozzi, 1997). Other simulations rooted from the same concepts of the cyclone model include a productivity study of a micro tunneling pipe installation (Luo & Najafi, 2007).

Finally, it is well noted that claims are a very tedious and complicated issue, considering the cost components that can be included within the claim, along with the very complicated schedule analysis effort. For these reasons, the resources as in cost, time and effort that would be put in a claim analysis should be significant. In other words, it has to address the most significant items/activities that are impacted in a claim other than the trivial items. In the road construction industry, the necessity to identify the significant items/activities is even a higher priority since most of the construction projects have few items that hold most of the significance of the scope of work. As an example, in new road construction most significant items will be the earthwork and the asphalt or concrete layer, depending on the road type. The following section will define the significance and emphasize the methods of separating the scope significant items.

Construction Items Significance

In civil engineering projects such as roads, bridges, dams, and other infrastructure projects, more than building projects, most of the costs and resources are attributed to a little portion of the work items in the scope of work or the bill of quantities (BOQ) of a job (Dmaidi, 2003b). These are considered the cost or resources “significant items” where most of the attention is directed to when a claim is being submitted or analyzed. In the next sections, the different significance types and definitions will be explained in detail.

Basic 80/20 Rules

The 80/20 rule is one of the most mentioned and well-documented in construction and civil engineering projects. It simply assumes that about 80% of the value of a project is contained within about 20% of the number of items in its BOQ (Asif & Horner, 1989; Horner, Murray & McLaughlin, 1990). These 20% of the BOQ mostly represents the significant items. The significance theory was originally introduced for operational estimating and to produce integrated cost and time models (Allman, 1988; Dmaidi, 2003a; Mair 1991). The same significance theory can be used for claim analysis in several cases and analysis techniques, such as focusing on the significant items activities in schedule window analysis or Time Impact analysis. It can be also utilized when applying some productivity loss quantification techniques such as baseline method or actual cost method where you only want to spend a lot of cost, time and effort on the most cost significant items.

Types and Definition of significance

In a civil engineering project's scope of work, significance can have more than one type. The significance can be considered in the most significant cost items which consumes most of the scope's cost or the most significant resource items which consumes most of the scope's resources as in labor and plant hours.

Items Significance Categorization

By considering the BOQ and contractor's estimates as the database for extracting the significant items, the significance can be split into two main types of constituents; resources costs and hours. In other words, resource cost significant items (RCSI) and resource hour's significant items (RHSI).

A greater emphasis on that categorization was shown by separating them further as in the following (Dmaidi, 2003a):

Resource cost significant items (RCSI) fall under:

- Labor cost significant items (LCSI)
- Plant cost significant items (PCSI)
- Material cost significant items (MCSI)

Resource hours significant (RHSI) items fall under:

- Labor hours significant items (LHSI)
- Plant hours significant items (PHSI)

These types can be simplified when categorizing road construction projects since it is mostly equipment and material intensive projects where only plant/equipment and material significance are required. Knowing the types of significance of construction items in a BOQ can be categorized. However, the question remains of how the significant items can be identified.

Significance identification

One of the most well- known and accepted significance identification methods was developed by Saket in 1986 using Pareto rules and regression analysis (Saket, 1986). This method defined the mean item value as a significance level of 1.0 which is the level of significance to produce the 80/20 relationship (Saket, 1986). According to this method then, a significant item will be the one in which its value is equal to or greater than the mean value of the bill. For example, a PCSI can be any item whose plant/equipment cost value is equal or greater than the mean plant/equipment cost for the total bill.

Design-Bid-Build (DBB) project delivery system

Also known as “Design-Tender,” “Traditional Method,” and “Hard Bid,” the design-bid-build method is the most widely-used and well-established project delivery method in the construction industry in general and in heavy civil projects specifically (Hancher, 1999; Ho, 2009). DBB is a project delivery method where the owner enters into two separate contracts, with two separate entities, a contract with an architect/engineering (A/E) firm that provides design services, plans, specifications, and construction documents for the project that are subsequently used by the owner to bid out the project and select a construction builder based on the solicited bids from different construction companies (Hale, Shrestha, Gibson & Migliaccio, 2009).

DBB use, benefits and drawback

Recently, a lot of different project delivery systems have been introduced and argued, and in some cases proved to be more efficient such as Design-Build (DB) (Jackson, & Mahoney, 2010; Shrestha, O’Connor & Gibson, 2012; Thomas, Macken, Chung & Kim, 2002;;). However, DBB is still the most used in the US. In the state of Colorado where the DB is fully authorized, CDOT is using the DB for only about 11% of its projects (Yakowenko, 2010). This is the main reason the DBB delivery system will be the chosen delivery system for this research.

The Texas Department of Transportation (TXDOT) has addressed the major advantages and drawbacks of the DBB delivery system as follows (Walewski, Gibson & Jasper, 2001):

Advantages of DBB Delivery system:

- Provides larger pool of potential bidders and subsequent competition which make it considered a considerably fair approach

- Simple and well known process for all practitioners where risk and rewards are easy to understand
- Reduces potential for corruption

Drawbacks of DBB delivery system:

- Process does not value speed of project delivery
- Innovation is often stifled and difficult to implement
- Disputes arise often over authority, responsibility and quality
- Limited ability to exclude poor and dishonest bids
- Difficult to integrate the construction knowledge into the design process

CHAPTER THREE: RESEARCH METHODOLOGY

Overview

The research questions are addressed by identifying the extent and manner by which delays and other parameters can affect the occurrence of claims that affect costs and schedule performance under DBB contracts. Another goal is to discover whether a practical claim relationship can be established and how a workable claims management system can be created at the lowest level of CDOT projects. The main hypothesis is that the identified factors and parameters affect claims occurrence and that delays are the major reason behind the claims. This is approached by collecting claim and project data and analyzing them statistically to test the hypothesis. The claims management system and best practices are developed from the results.

The source of projects and claims data will be the Colorado State Department of Transportation (CDOT) which manages some 8,591 bridges and 88,266 center line miles of public roads (ASCE Report Card, 2013; CDOT Fact Book, 2011).

Data Sources

CDOT claims and project records are kept in various forms in different locations. Most project information and data including the bill of quantities “BOQs” can be found in final pay estimates which are kept in a digital format. The claims are in a hand-typed Access data base in the project development department at CDOT headquarters. Data obtained included the following:

1- General project information including the project name, job number and CDOT project geographical location (zone).
2- Detailed project information including the project type, scope of work and the material used in roads (asphalt or concrete).
3- Detailed project contractual and financial information including the project letting year, which indicates the specifications version used in the project and the schedule type that is used in the contract.
4- Specific claims information including but not limited to the year of report, the claim basis such as differing site conditions, plan or specification errors, utility delays, material changes (out of specifications), time or schedule, plan or specification differing interpretations and the level of claim settlement.

All project and claim information was collected from CDOT and the personal information such as names of the contractors and subcontractors were deleted to protect their identities. Data on all projects with claims were retrieved and analyzed.

The projects information came in two sets: from the Site Manager Project Listing that includes all the projects within the years 2003 to 2012 which originally included 1,060 projects; and another set with all claims with their attributes. The Site Manager set was screened for data problems and reduced to 780 projects with 62 claim-contained projects. The other claims data set with project attributes dated from 1997 to 2012 with 213 claims. All data were screened, filtered and organized as shown in Appendix A. Data analysis was tedious and time-consuming to separate claims contained projects from the thousands of projects that were let within 12 to 14 years. This resulted in a total number of claim containing projects of 106 projects and about 213 claims. The numbers vary in the analysis because not every project has all the aspects of the

parameters (e.g. claim settlement level may be missing). Figure 6 represents the data sets to illustrate how the projects were organized from CDOT data sets.

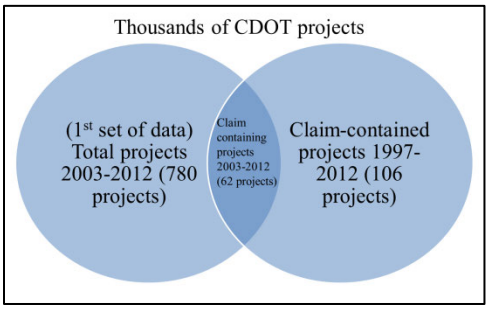


Figure 6. Project data sets

Some important details of the data sets are described next.

Final Project Estimate Reports:

Every CDOT project has several progress and one final pay estimate files. The final pay estimate file is the most current and informative source for this research (Appendix B). Each final pay estimate file was collected from CDOT websites and analyzed to obtain the following data: project name; project number; project letting year; original engineering estimate and award cost; final actual project cost; original contractual time allowed; final actual time for the job completion; type of project schedule restriction (duration vs. fixed completion date); and number of added items (e.g. change orders, contract modifications, etc.). Additional data such as liquidated damages, cost of Dispute Resolution Board (DRB) and others were also considered.

Site Manager Project Listing:

This is a program that lists all CDOT Projects with the following parameters (Appendix A): project award date; project code number; project geographical location with respect to the CDOT region system (6 CDOT regions); the award bid amount; actual paid amount; (net earnings from final pay estimate); original time allowed; and final time charged.

This provides similar information as the final pay estimate files but in a more organized tabulated manner. It makes it easier to determine the project situation as in (over budget vs. under budget) and (ahead of schedule vs. behind schedule).

Project Development Department Access database:

This database was provided by the project development department representative in the form of a Microsoft Access database file that includes all claims represented in the claim-contained projects (Appendix A). These files include the following information for each claim in addition to the project information: claim and dispute basis; description of the claim; CDOT explanation of the claim; work category in the specifications that the claim is related to; classification of the claim according to the unanticipated conditions set by CDOT; level of the claim settlement; and the claim auditing status.

CDOT Specification Books:

The 2011 CDOT specification is the standard for road and bridge construction to be used on any contract awarded by CDOT. It includes seven general divisions from Division 100 to Division 700. The first division is “Division 100” which addresses the general provisions of the contract including but not limited to bidding, award, scope of work, control of work and material, legal issues, progression and payments. Division 200 through 600 address the construction details including earthwork, bases, pavements, structures, and miscellaneous construction. Finally, Division 700 addresses different material details.

The data were utilized to answer the questions as demonstrated in Figure 7, which shows the research questions and how the data are used to answer the research questions.

The Unit of Analysis is the level where the data are gathered and is represented in the claims filed with CDOT. The population comprises the projects executed under the CDOT umbrella and the research sample is a subgroup of the targeted population.

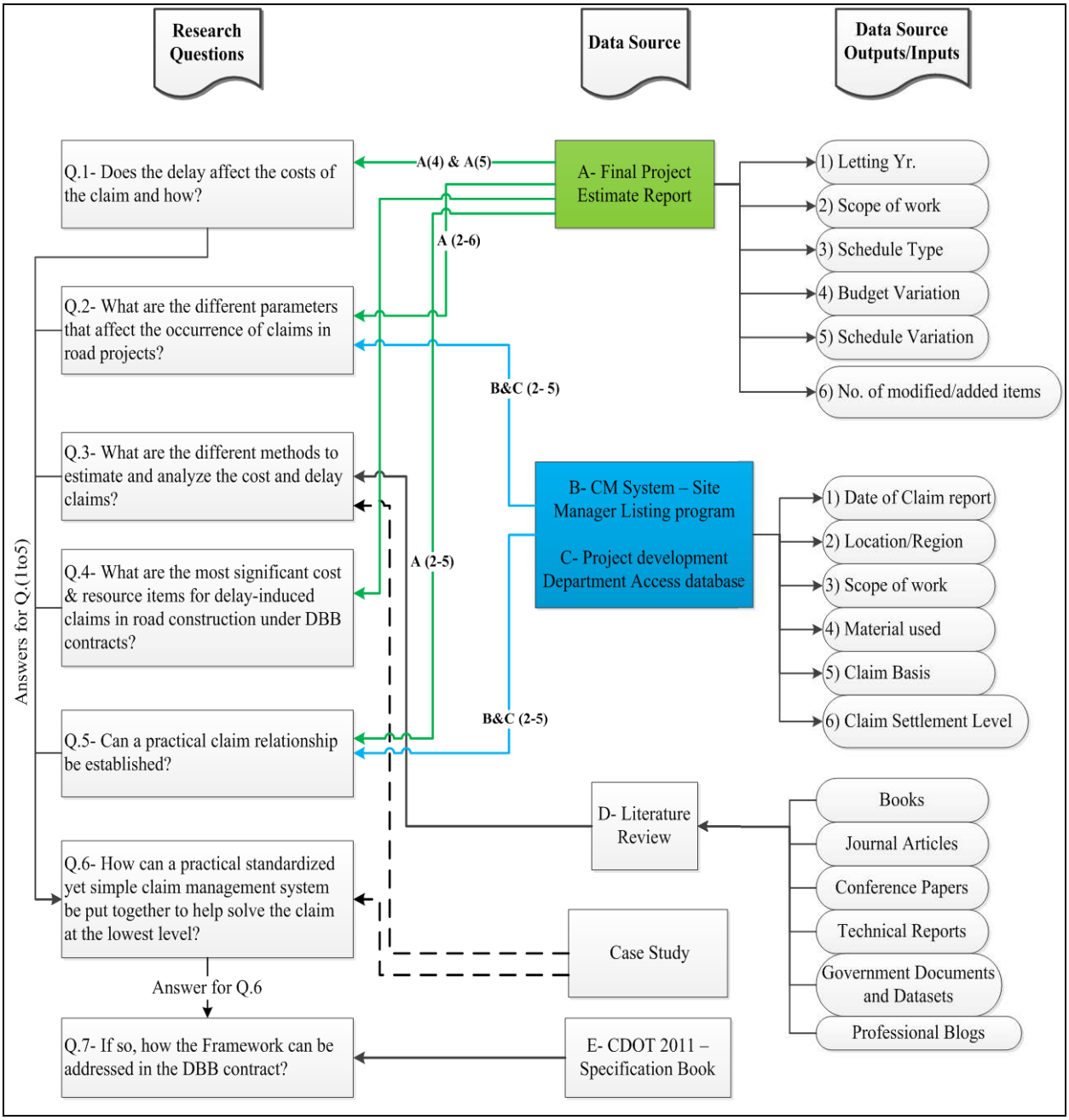


Figure 7. Data Sources and its use in the research methodology

Identification and Description of claim parameters

The factors and parameters were organized in spreadsheets with eleven major parameters as shown in Table 2.

Table 2. Claim Parameters details, count and data sources

Category / parameter No.	Major parameters /categories	Brief Description	Claim Count	Project count	Data Source
1	Date of Report	The year when the claim was reported	191	**N.A**	3 & 4
2	Letting Year	The year when the project let	204	**106**	2
3	Location (Region)	Geographic physical Location according to CDOT regional organization system	212	**114**	3 & 4
4	Scope of Work	Scope of the project work	204	**105**	2, 3 & 4
5	Material used	Primary material used in Road projects	150	**78**	3 & 4
6	Schedule type	schedule restrictions as in fixed completion dates vs. calendar/working days	204	**105**	2
7	Budget Variation	Variation of the final cost/budget from the engineering estimate	204	**105**	2
8	Schedule Variation	Variation of the final from the original/planned schedule	204	**106**	2
9	Claim Basis	Basis of the dispute for the project claim	161	**N.A**	3 & 4
10	Number of added/modified items	Number of additions and modifications on a project	N.A	**107**	2
11	Level of Claim Settlement	Different levels of claim settlement	202	**N.A**	3 & 4

2 = Final Project Estimates Reports,
3 & 4 = Construction Manager System - Site Manager project Listing Program + Project Development Department Access Database for Claims.

The claims data dated from 1997 to 2012. Of 213 claims, some 191 had a date of report. The letting year is the date when construction was authorized by CDOT. The letting year and claims data were reported and classified in the same manner as the date of report for 1997 to 2012. However, the date of report only addressed the project count while the letting year addressed the projects let and their claims for the year. The letting year also indicates that projects were issued with different specification books and a different number of specification books over a decade can affect the claim resolution and settlement process.

CDOT operates over six regions covering 104,094 sq. mi (269,837 km^2) and is responsible for a 9,146 mile highway system with 3,447 bridges and over 27 billion vehicle miles of travel per year (CDOT Fact Book, 2011). The research accounted for the region as a parameter to capture potential distinctive characteristics due to different project locations (Figure 8 and Table 3).

Table 3. CDOT Regions by Zone

Region no.	Name
1	Zone 1 - Aurora
2	Zone 2 - Pueblo
3	Zone 3 - Grand Junction
4	Zone 4 - Greeley
5	Zone 5 - Durango
6	Zone 6 - Denver Metro

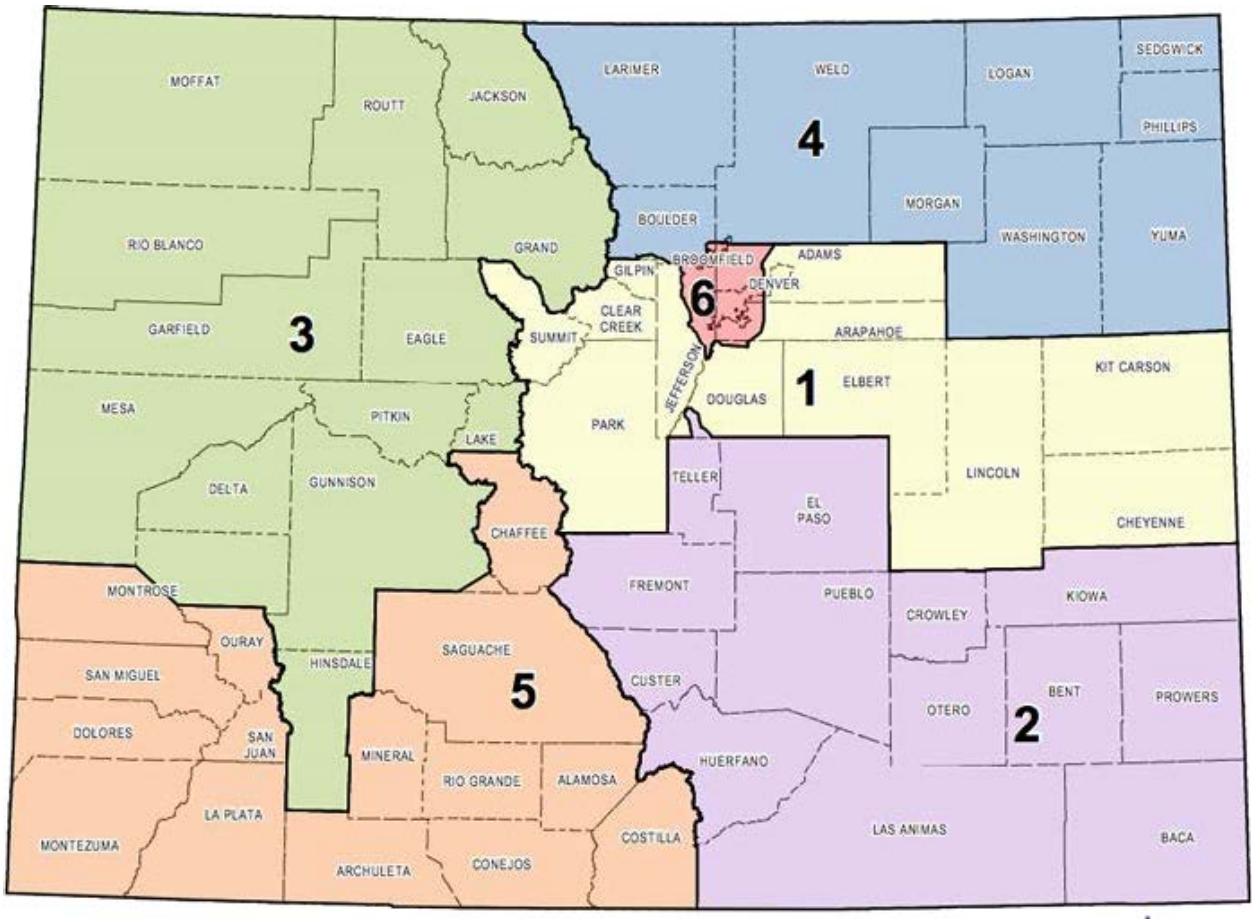


Figure 8. Geographical representation of CDOT Zones/Regions Locations

The claim-contained projects over the last decade include roads, bridges and a combination of the two in certain projects, along with other projects that include signage, Intelligent Transportations systems (ITS), tunnels, and others. However, most of the claim-contained projects involve roads and bridges. For this reason, the data are categorized for scope of work as in roads, bridges and other as in Table 4. Subcategories include type of material used in construction, mainly asphalt, concrete and a combination of asphalt and concrete. This is useful because roads may require asphalt or hot mix asphalt (HMA) for resurfacing or reconstruction, while other projects may require concrete products or a mix, such as concrete in major intersections.

Table 4. Scope of Work Parameter Categorization

Scope of Work	
Road	Asphalt
	Concrete
	Combination of Asphalt and Concrete
Bridge	
Road & Bridges	
Other	

Another subcategory differentiates between different scopes of work as in table 5.

Table 5. Scope of Work parameter detailed categorization

Additional detailed classification for the Scope of Wk.
Surface Treatment
Widening
Bridge
New & Re-Construction
Resurfacing
Safety
Traffic Signals
Miscellaneous
Rehabilitation & Maintenance

Project duration can be provided in two forms within the contract (Table 6). It can be an amount of time in calendar or working days, which is the most frequent case, or it can be a fixed completion date. The differentiation between those types is important because the fixed completion date is more aggressive towards scheduling, where the contractor can make claims to evade an aggressive deadline and the owner can be anxious to use liquidated damages.

Table 6. Schedule Type parameter categorization

Contractual schedule type	Schedule duration
	Fixed Schedule completion date

After CDOT adopts a project, the design engineers in the estimation and market analysis department at CDOT's business center develop a budget cost and baseline schedule for the project to serve as the baseline reference for budget, scope, duration and program planning. For these, the engineers use established average costs and production rates as in the cost data books for CDOT. The data sets use a statewide average for each pay item, so it does not represent the project's uniqueness and every project is different. And lower and higher actual costs can initiate claims (See Table 7).

Table 7. Budget Variation parameter Categorization

Type of Variation	Categorization of the variation
Budget Cost Variation	Under - Budget
	Over-Budget (within 5%)
	Over-Budget (5% to 10%)
	Over-Budget (more than 10%)
Schedule Duration Variation	Ahead of Schedule
	Behind Schedule (within 25%)
	Behind Schedule (25% to 100%)
	Behind Schedule (more than 100%)

Most project pay estimates at CDOT had added items to account for any modifications and changes in the scope of work, cost, schedule, or other project components in the contractual documents. Any changes are represented by an "Added-Item" that can be seen in the final pay

estimate reports. These were organized to represent the added items for every claim-contained project (Table 8).

Table 8. Number of Added Items parameter Categorization

Number of added items Within the Project	Under 10 Added items
	(within 10) Added Items
	(10 to 20) Added Items
	Over 20 Added Items

Every claim goal is towards an additional compensation whether it is added extension of time, additional monetary value or both. However, the origins of the claims can be based on different grounds. The grounds for the collected claims were identified and analyzed. The claim bases were grouped and analyzed in three different ways. The first categorization of this parameter is according to the CDOT unanticipated claim conditions related to: different site condition, plans and specifications, different interpretations, plans or specification errors, utility delays, time or schedule reasons, material changes, right of way (ROW), or other. The second categorization is according to the CDOT specifications sub-sections, e.g. 102.8, 102.4, 203, etc. The final categorization is grouping the second categorization into its main sections of the CDOT specification book as Bidding (102), Scope of Work (104), Earthwork (200), and all of the other sections in the CDOT specification book. The categorization of this claim parameter is illustrated as shown in Table 9.

Table 9. Claim Basis parameter Categorizations

Categorization according to CDOT unanticipated claim conditions	Categorization according to CDOT Specification Book Sections
Differing Site Condition	Bidding (102)
Plan or Spec Differing Interpretations	Scope of Work (104)
Plan or Spec Errors	Control of Wk. (105)
Utility Delays	Material Control (106)
Time or Schedule	Legal & Resp. (107)
Material Changes/Out of Spec	Progress & Prosecution (108)
ROW	Payment & Meas. (109)
Other	Earthwork (200)
	Bases (300)
	Pavement (400)
	Structures (500)
	Misc. Construction (600)
	Material detail (700)

Each claim filed for CDOT should follow CDOT specifications book section 105 which address the “Disputes and Claims for Contract Adjustment.” This section has a disputes and claims flowchart that visualizes the dispute handling process from the time it is filed and noted until its resolution, which can happen on a multitude of levels. The data that address the different levels where a claim dispute is resolved or settled were collected, organized, and analyzed. This parameter is categorized mainly in four different categories as in Table 10. These categories represent the ascending levels of the dispute resolution and settlement thorough the CDOT disputes and claims resolution system.

Table 10. Levels of Claim Settlement within the CDOT System

Level of Settlement	Level Description
1	PE (Project Engineer)
2	RTD (Regional Transportation District)
3	CE (Chief Engineer)
4	CE/Arbitration (chief Engineer + Arbitration Committee)

Those four levels were found to be the most common occurrences in claims and disputes resolution, and that was the main reason to categorize the level of settlement accordingly. However, other levels of settlement can includes a Dispute Resolution Board (DRB) Hearing that can render a recommendation, an optional mediation, and finally litigation that ends up with a court decision.

Choice of Analytical Methods

The data provide a source of information to study the characteristics and causal factors represented in the different claim parameters. This section will outline the methods used to organize the data to reach the goal of the research and to demonstrate the flow of data through each step. The process uses several analytical methodologies as shown in Figure 9.

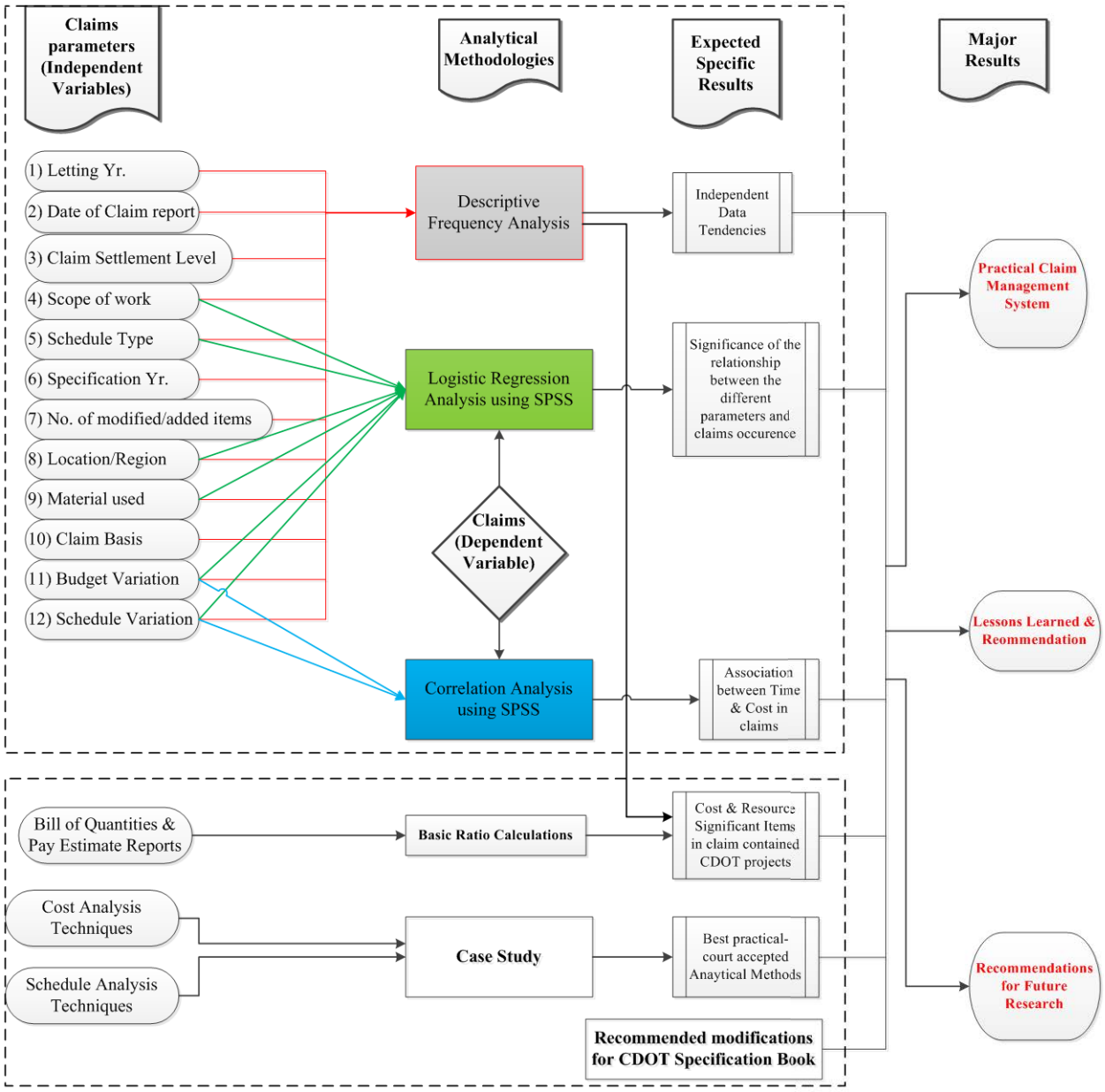


Figure 9. Overall Research Methodology

Frequency distribution and Percentage Analysis

The analytical methods are based on descriptive statistics that help to explain the measurement terms in the claims parameters data (Morgan, Leech, Gloeckner & Barrett, 2007).

The data in spread sheets were analyzed for frequency and percentages for each category within the claim parameters using Microsoft Excel software. The results were represented as bar charts, percentage tables and pie charts to demonstrate the counts and percentages.

Logistic Regression Analysis

After completing the frequency analysis on the data collected in the spreadsheets, logistic regression analysis was performed using SPSS Statistics software. Logistic regression, like other statistical modeling techniques, aims to find the best fit and reasonable model to describe the relationship between a dependent variable (outcome) and a set of independent variables (predictors) (Hosmer & Lemeshow, 2000). Logistic regression is an extension of multiple regression to analyze situations where the dependent variable is categorical (nominal) (Cohen, Cohen , West & Aiken, 2003). The main goal of logistic regression is to examine whether the probability of getting a particular value of the nominal dependent variable is associated with a measured independent variable. It is also used to predict the probability of getting a particular value of the nominal dependent variable, given the measurement variable (McDonald, 2008). From a statistical approach, the logistic regression is trying to identify the best fitting model that describes the relationship between a nominal "binary" dependent variable and other independent variables (Washington, 2011).

Mathematically, the logistic regression modeling approach involves fitting data to a logit function on S-curve. In this research, it creates a logistic function with a claim on the horizontal axis and f (Claim) on the vertical axis, where the S-curve demonstrates the probability of claim increase when the probability of the no-claim decreases and vice-versa, as in the case of the nominal variables of (0) for no-claim and (1) for claim. In short, logistic regression does not

directly measure the variable, instead it measures the probability of obtaining a particular value of the nominal variable.

The logistic regression model approach was used to test all the claim parameters as independent variables individually and collectively on the nominal dependent variable of claim occurrence utilizing a variety of logistic regression analysis.

Correlation Analysis

Correlation analysis is generally used to describe and measure the degree of association between variables. It can be defined as a test to assess the tendency for two or more variables to vary consistently (Creswell, 2008). This type of analysis was used to examine the tendency of some of the claim parameters to vary consistently and their degree of association within the research.

Case-Study

To supplement the statistical analysis, a case study was conducted to apply the methods of claim analysis regarding delay claims and their costs to examine the following:

1- The difference between the methods used by the construction industry to analyze delay claims costs and emphasize the difference in results and help the understanding of the different methods applications.
2- The different outcomes from different methods can demonstrate the advantages and pitfalls of different method and their situational suitability.
3- Help establish a better standardized claims management system that uses the best practices as emphasized in the Case Study, which should avoid as possible, most of the pitfalls and take most of the advantages demonstrated.

In general, the case-study should provide a more thorough analysis and demonstration of the different claims management analysis methodologies and applications. It will mainly show the differences, advantages and disadvantages of these delay analysis techniques. It will also show the susceptibility of the delays to be manipulated one way or another by using different forensic scheduling techniques and the need to standardize the process so that it cannot be abused or manipulated to the advantage of either party.

CHAPTER FOUR: ANALYSIS AND RESULTS

This chapter presents the data analysis and results. The first two sections present statistical results and the last section presents the case study.

Frequency Analysis

The claims parameter data (Appendix A) were analyzed for frequencies and percentages using functions and charting tools within Microsoft Excel software. As explained earlier, the number of projects was 780, with 113 claim-contained projects that include 213 claims.

The data analyzed for the parameters claim report, claim-contained project, and the claim per letting year are presented in Table 11 along with Appendix D (Figures 21, 22 & 23). Table 11 presents the count and percentages of claim reports, the claim contained projects and the letting year of the projects with claims.

Table 11. Frequency & Percentage Analysis for Claims Report date and Letting year

	Frequency & Percentages					
Year	Date of Claim Report		Claims per Letting year		Claimed Contained project per Letting year	
1997	0	0.0%	3	1.5%	2	1.9%
1998	0	0.00%	4	1.9%	4	3.8%
1999	2	1.1%	6	2.9%	4	3.8%
2000	2	1.1%	29	14.2%	13	12.3%
2001	14	7.3%	13	6.4%	6	5.7%
2002	37	19.4%	58	28.4%	16	15.1%
2003	29	15.2%	13	6.4%	12	11.3%
2004	13	6.8%	11	5.4%	8	7.6%
2005	14	7.3%	12	5.9%	11	10.4%
2006	20	10.5%	12	5.9%	4	3.8%
2007	9	4.7%	9	4.4%	6	5.7%
2008	21	10.9%	17	8.3%	9	8.5%
2009	19	9.9%	11	5.4%	5	4.8%
2010	8	4.2%	5	2.5%	5	4.8%
2011	3	1.6%	1	0.5%	1	0.9%
Totals	191	100.0%	204	100.0%	106	100.0%

Only completed projects through 2011 are included. The greatest number of claims (about 20%) and the most claim contained projects (about 28%) were in 2002. Most claims were related to projects let in 2000 to 2005. CDOT changed its specification book after 2005, and this may explain the decrease of claims after 2005 with the exception of 2008, which is the year of the financial crisis.

Table 12 along with Appendix D (Figures 24, 25 & 26) presents the results for the counts and percentages of claim parameters by region.

Table 12. Frequency and Percentage Analysis for Claims per Region

	Frequency & Percentages					
Region	Claim / CDOT Region		Claim-cont. project / CDOT Region		Total Projects Analyzed	
1	26	12.3%	21	18.4%	134	17.2%
2	64	30.2%	24	21.1%	109	14.0%
3	19	8.9%	14	12.3%	137	17.6%
4	23	10.9%	9	7.9%	139	17.9%
5	43	20.3%	21	18.4%	89	11.4%
6	37	17.5%	25	21.9%	170	21.9%
Totals	212	100.0%	114	100.0%	778	100.0%

Region 2 is the highest area with reported claims and Region 6 is highest in claim-contained projects. Region 6 is the Denver Metro area with the most completed projects and highest budget. On the basis of the ratio of the claims and claim-contained projects to the number of projects, Regions 2 and 5 are the highest.

Scope of work was analyzed in terms of the type of project. The claims were divided into Road, Bridge, Road and Bridge, and Other. And the data analyzed were broken into a more comprehensive categorization as in the data from 2003-2012 which was categorized by subcategories (table 13) and Appendix D (Figures 27, 28 & 29).

Table 13. Frequency and Percentage Analysis for Claims per Scope of work

	Frequency & Percentages				***Frequency & Percentages(2003-2012)***				
Scope of Work	Claim / scope of Wk.		Claim-cont. project / Scope of Wk.		Detailed Scope of Wk. Total Analyzed projects			No. of Claims / detailed scope of Wk.	
Road	143	70.1%	72	68.6%	Surface Treatment	54	6.9%	4	7%
Bridge	20	9.8%	13	12.4%	Widening	43	5.5%	5	12%
Road & Bridge	6	2.9%	5	4.8%	Bridge	87	11.2%	11	13%
Other	35	17.2%	15	14.3%	New & Re-Construction	85	10.9%	13	15%
Totals	204	100.0%	105	100.0%	Resurfacing	239	30.6%	14	6%
					Safety	154	19.7%	5	3%
					Traffic Signals	21	2.7%	1	5%
					Miscellaneous	69	8.9%	7	10%
					Rehabilitation & Maintenance	28	3.6%	2	7%
					Total	780	100.0%	62	

Based on the analysis and the charts, it is seen that most claims were for road projects with resurfacing and safety goals. However, this is not an indicator that road projects are more claim-oriented than other projects because most of the projects done by CDOT and analyzed in the study are road projects.

The main material used in every project was analyzed as shown in Table 14 along with Appendix D (Figures 30, 31 & 32).

Table 14. Frequency and Percentage Analysis for Claims per project material type

	Frequency & Percentages				***Frequency & Percentages(2003-2012)***		
Scope of Work	Claim / Material type		Claim-cont. project / Material Type		Material Type for Total Analyzed projects		
Concrete	69	46.0%	35	44.9%	Concrete	54	8.7%
Asphalt	81	54.0%	43	55.1%	Asphalt	435	69.7%
Totals	150	100%	78	100.0%	Combination Asphalt & Concrete	135	21.6%
					Total	624	100.0%

Most of the claims and the claim-contained projects are related to asphalt projects. This is evident from the fact that asphalt is used more than concrete and there will be more rehabilitation and maintenance related to asphalt because it has a shorter life cycle than concrete. However, it is still possible that concrete may have the highest percentage of claims.

A fixed date completion forced in the contract versus a number of calendar or working days can affect the perceptions of both parties about cost, schedule and claims. Table 15 along with Appendix D (Figures 33, 34 & 35) show the total projects per schedule type for 2003-2012.

Table 15. Frequency and Percentage Analysis for Claims per Schedule Type

	Frequency & Percentages					
Schd. type	Claims by schd. type		Claim-cont. project / schd. type		Schd. type for total analyzed projects	
Fixed date	58	28.4%	22	20.7%	165	21.2%
Schd. days	146	71.6%	84	79.3%	615	78.8%
Totals	204	100.0%	106	100.0%	780	100.0%

The percentage analysis and frequency charts indicate more claims and claim-contained projects with the calendar/working days schedule. Again, this is due to the fact that most of the

contracts are based on scheduled days. However, the fixed date schedule type can still be regarded as more susceptible to claims as the contractor may want to avoid risk and CDOT may want to enforce the completion date. The contractor may make more delay claims to counter risk in situations when behind schedule due to uncontrolled project conditions.

Budget variation describes how under or over budget a project is. The budget variation parentage analysis and frequency charts are presented as shown in Table 16 and Figures 10, 11 and 12.

Table 16. Frequency and Percentage Analysis for Claims per Budget Variation category

	Frequency & Percentages					
Budget Variation	Claims by Budget Variation		Claim-cont. project / Budget Variation		Budget Variation for total analyzed projects	
Under – Budget	31	15.2%	18	17.1%	284	36.4%
Over-Budget (less than 5%)	46	22.5%	22	20.9%	182	23.3%
Over-Budget (5% to 10%)	66	32.4%	26	24.8%	131	16.8%
Over-Budget (more than 10%)	61	29.9%	39	37.1%	183	23.5%
Totals	204	100.0%	105	100.0%	780	100.0%

Figure 10 represents the number of claims for each variation of the budget which is divided into four different variations as shown in the figures while Figure 11 shows the claim-contained projects for each budget variation, and finally Figure 12 shows the total analyzed projects per variation for all projects analyzed in the period of 2003-2012.

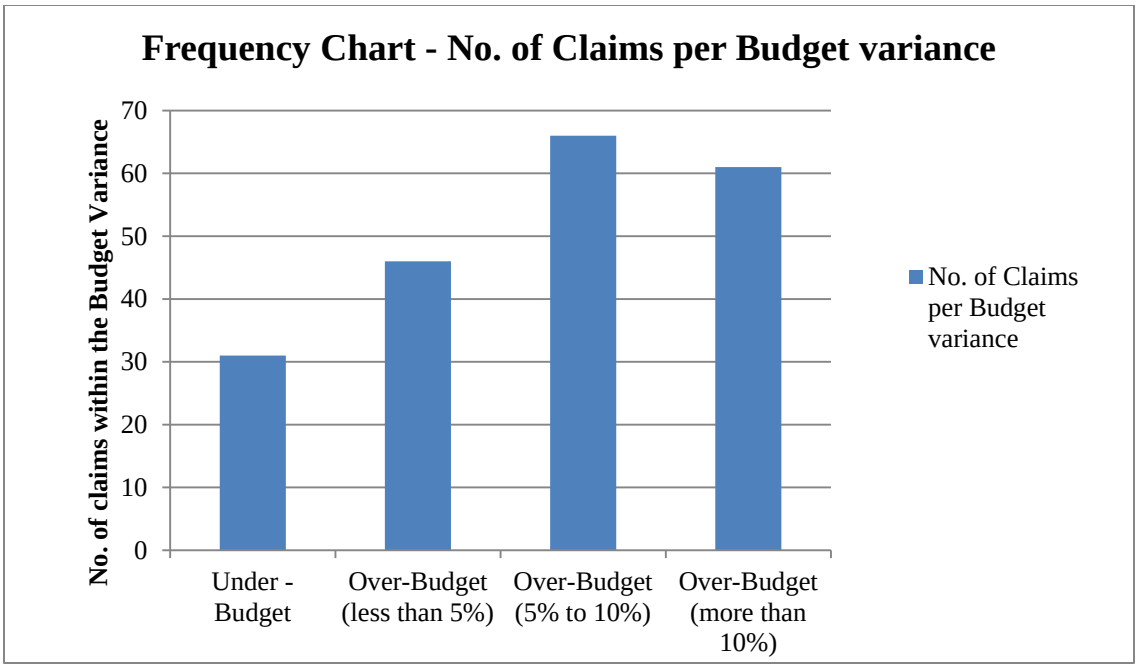


Figure 10. Frequency Chart for Claims per Budget Variation

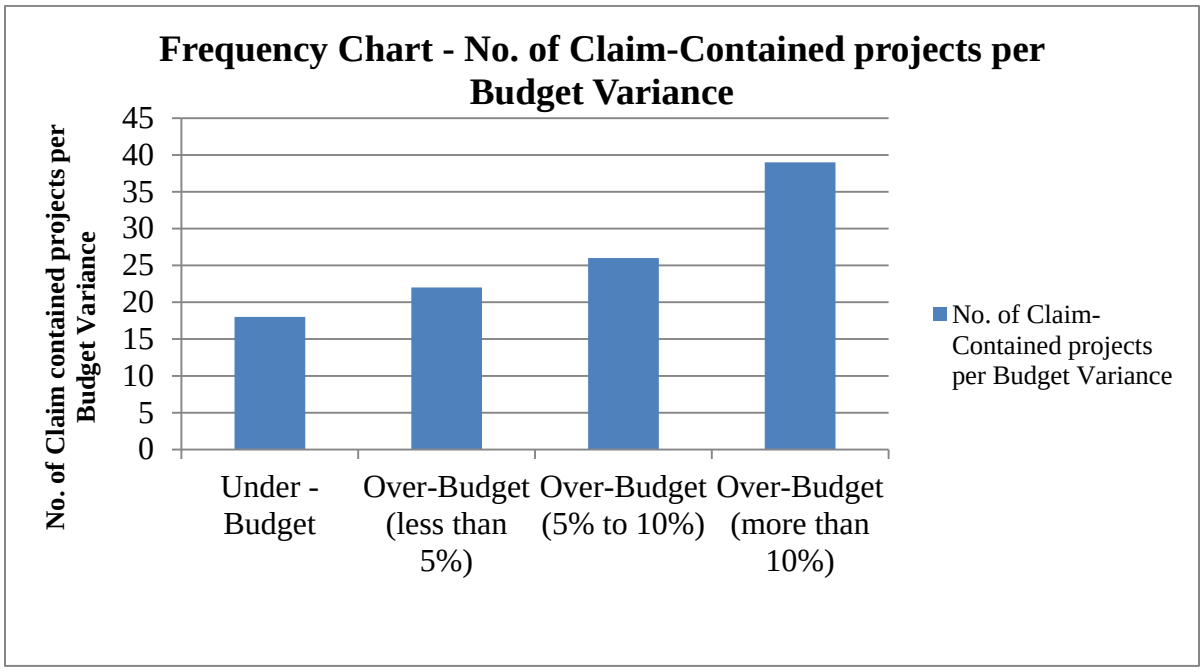


Figure 11. Frequency Chart for Claim-Contained projects per Budget Variation

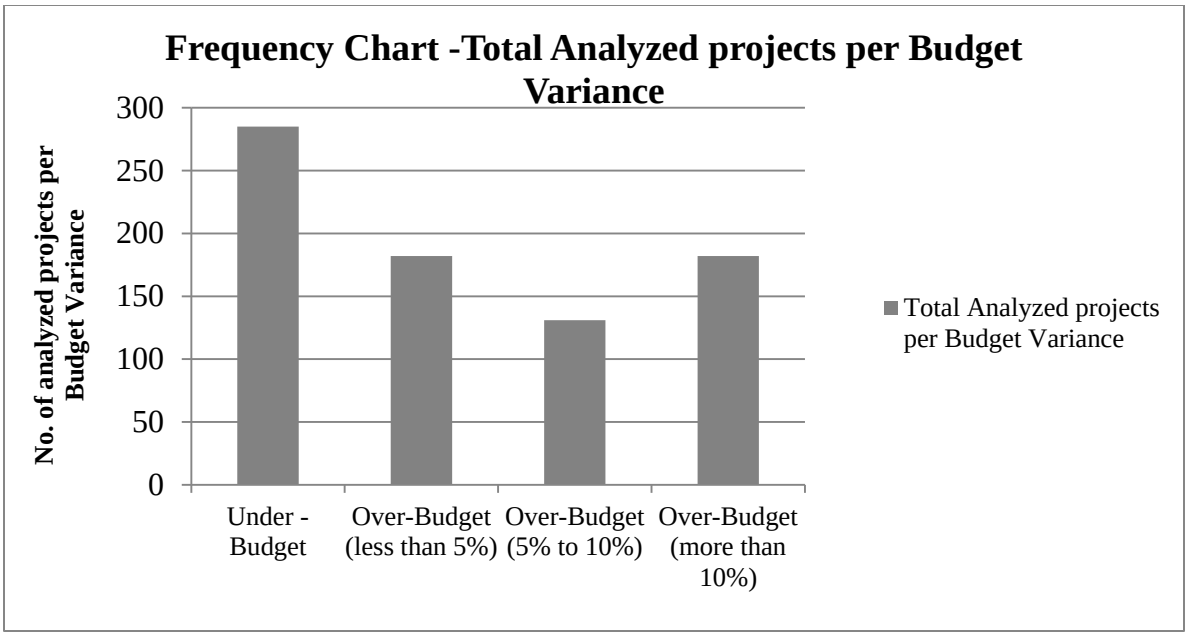


Figure 12. Frequency Chart for the Total analyzed projects within the Budget variation parameter

The charts show a trend where, the more over budget projects are, the more the probability that they have claims. Most claims were associated with the variation of 5% to 10% over budget and most of the claim-contained projects are over budget by more than 10%.

Four variations of schedule are represented as in Table 17 and Figures 13, 14, and 15.

Table 17. Frequency and Percentage Analysis for Claims per Schedule Variation category

	Frequency & Percentages					
Schedule Variation	Claims by Schedule Variation		Claim-cont. project / Schedule Variation		Schedule Variation for total analyzed projects	
Ahead of Schd.	28	13.7%	23	21.9%	380	48.7%
Behind Schd. (less than 25%)	100	49.0%	43	40.9%	124	15.9%
Behind Schd. (25% to 100%)	64	31.4%	35	33.3%	117	15.0%
Behind Schd. (more than 100%)	12	5.9%	4	3.8%	159	20.4%
Totals	204	100.0%	105	100.0%	780	100.0%

Figure 13 represents the number of claims for each variation of the schedule which is divided into four different variations as shown in the figures while Figure 14 shows the claim-contained projects for each schedule variation, and finally Figure 15 shows the total analyzed projects per variation for all projects analyzed in the period of 2003-2012.

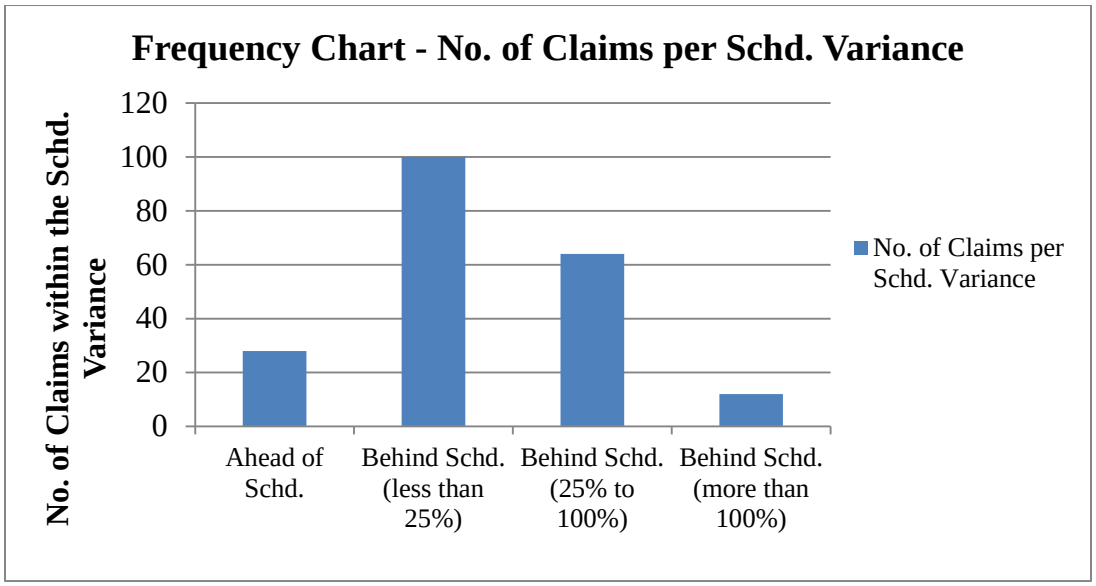


Figure 13. Frequency Chart for Claims per Schedule Variation

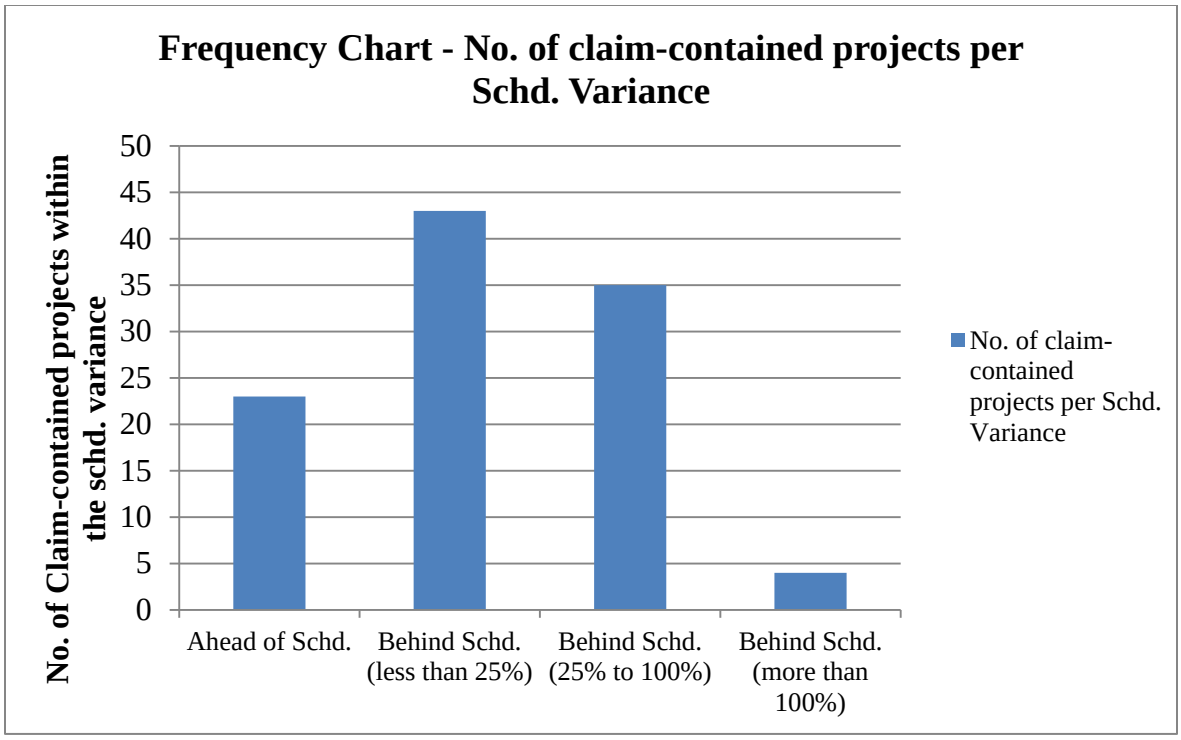


Figure 14. Frequency Chart for Claim-Contained projects per Schedule Variation

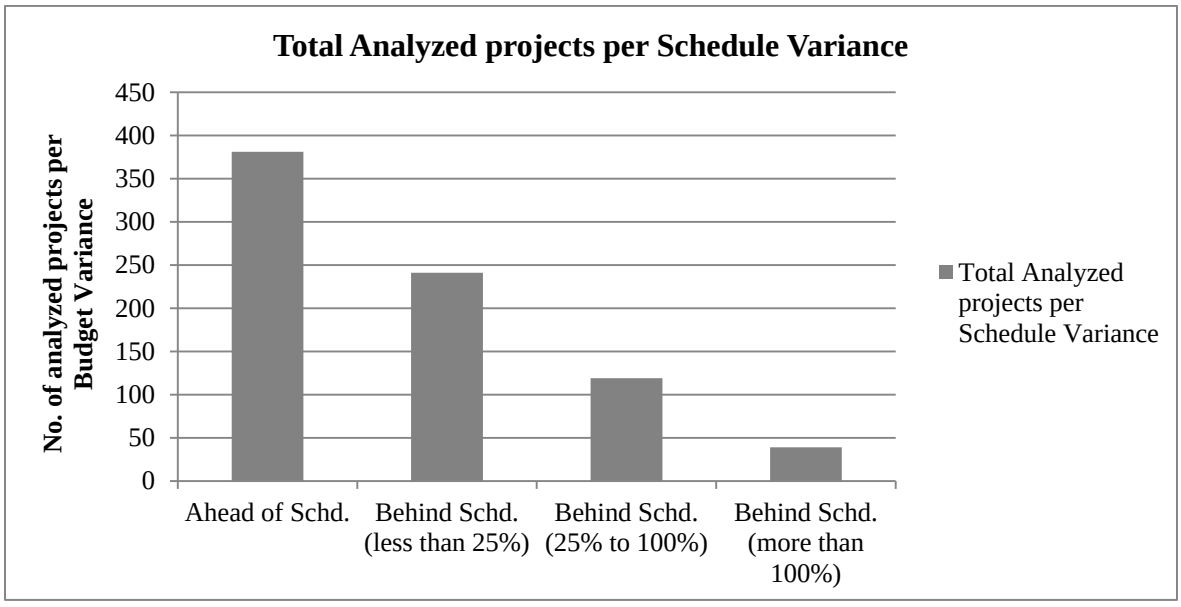


Figure 15. Frequency Chart for the Total analyzed projects within the Schedule variation parameter

Most claims and claim-contained projects were associated with projects that were less than 25% behind schedule.

The Basis of claims is important for legal and contractual reasons. The claim basis was analyzed based on the primary CDOT claim/dispute basis in their databases and based on the work category related to the CDOT specifications. The analysis results are as shown in Table 18, Figures 16 and 17 along with Appendix D (figure 36).

Table 18. Frequency and Percentage Analysis of Claims Basis

Frequency & Percentages					
CDOT Claim Basis			***Specification Claim Basis***		
Differing Site Condition	37	23%	Bidding (102)	4	2%
Plan or Spec Differing Interpretations	31	19%	Scope of Work (104)	22	14%
Plan or Spec Errors	20	12%	Control of Wk. (105)	10	6%
Utility Delays	9	6%	Material Control (106)	3	2%
Time or Schedule	33	20%	Legal & Resp. (107)	3	2%
Material Changes/Out of Spec	14	9%	Progress & Prosecution (108)	37	23%
Other	17	11%	Payment & Meas. (109)	6	4%
Total	161	100%	Earthwork (200)	31	19%
			Bases (300)	2	1%
			Pavement (400)	16	10%
			Structures (500)	9	6%
			Misc. Construction (600)	15	9%
			Material detail (700)	4	2%
			Total	162	100%

Figure 16 represents the number of claims for CDOT unanticipated claim conditions which is divided into seven different claim basis while Figure 17 shows the percentage of claims related to each work category within the CDOT different specification sections within the

specification book. The numbers of claims were related to 13 different sections within the specification book.

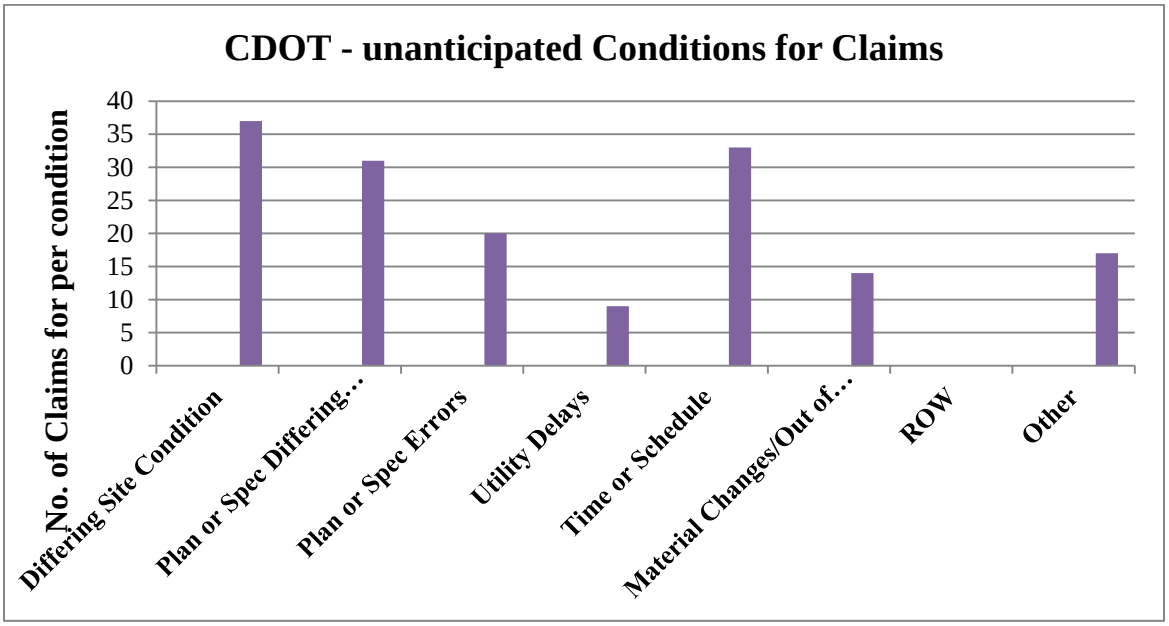


Figure 16. Frequency Chart for the Claim Basis per CDOT unanticipated Conditions

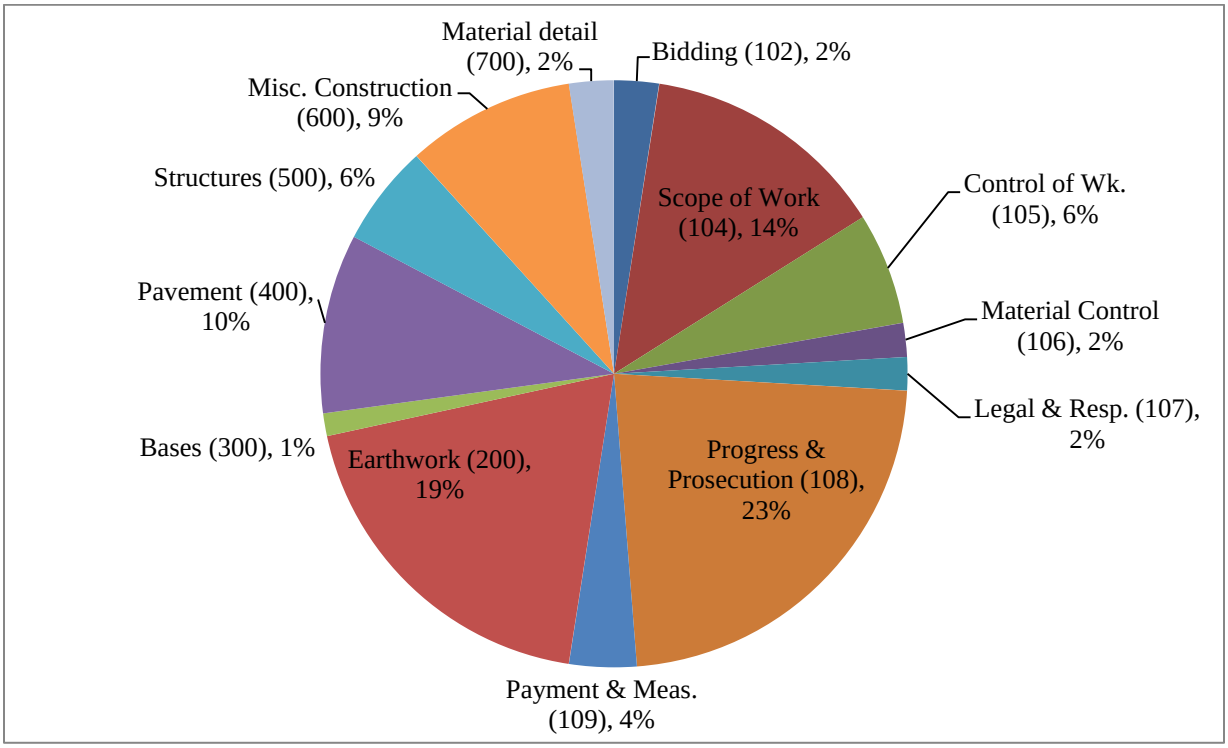


Figure 17. Pie Chart for the Claim Basis per CDOT Specification Sections

Most of the claims were related to un-anticipated differing site conditions and time or schedule basis of claims. Based on the specification section, most claims were related to the progress and prosecution which is mostly “delays.” Another big claims basis was the earthwork, which is generally one of the biggest items in road contracts.

From this, it is evident that from basis of disputes and claims, the delays are the main problem associated with the most number of claims.

Another issue thought to affect claims was the number of modifications or added items (AI) per project. This was the main reason behind collecting the number of modification/added items per claim contained projects and analyzing this parameter as shown in Table 19 and Appendix D (Figure 37).

Table 19. Frequency and Percentage Analysis for Claims per Added/Modified Items (AI)

Number of Added/Modified Items	***Frequency & Percentages***	
No Added Items (AI)	11	10%
AI (Less 10)	67	63%
AI (10 to 20)	12	11%
Over 20 AI	17	16%
Totals	107	100%

The table and chart shows the number of modification/added items for each project that contained a claim. Most of the claim-contained projects were attributed to projects which have up to 10 modifications or added items. However, no trend or proportionality can be observed from the frequency chart. This can be due to the fact that added items or added work are not necessarily a negative change order or claim which speaks for the reason of why no association were observed in this analysis.

Finally, each claim has been settled within CDOT at different levels. The levels of settlement were categorized into four groups and analyzed for results as shown in Table 20 and Figure 18. The level of claim settlement does not have to be considered to be a claims parameter. However, it is an informative analysis to show how the claims have been handled in CDOT within this period of time.

Table 20. Frequency and Percentage Analysis for Claims per CDOT Level of Settlement

Level of Claim Settlement	***Frequency & Percentages***	
PE (Project Engineer)	112	55%
RTD (Regional Transportation District)	30	15%
CE (Chief Engineer)	30	15%
CE/Arbitration (chief Engineer + Arbitration Committee)	30	15%
Totals	202	100%

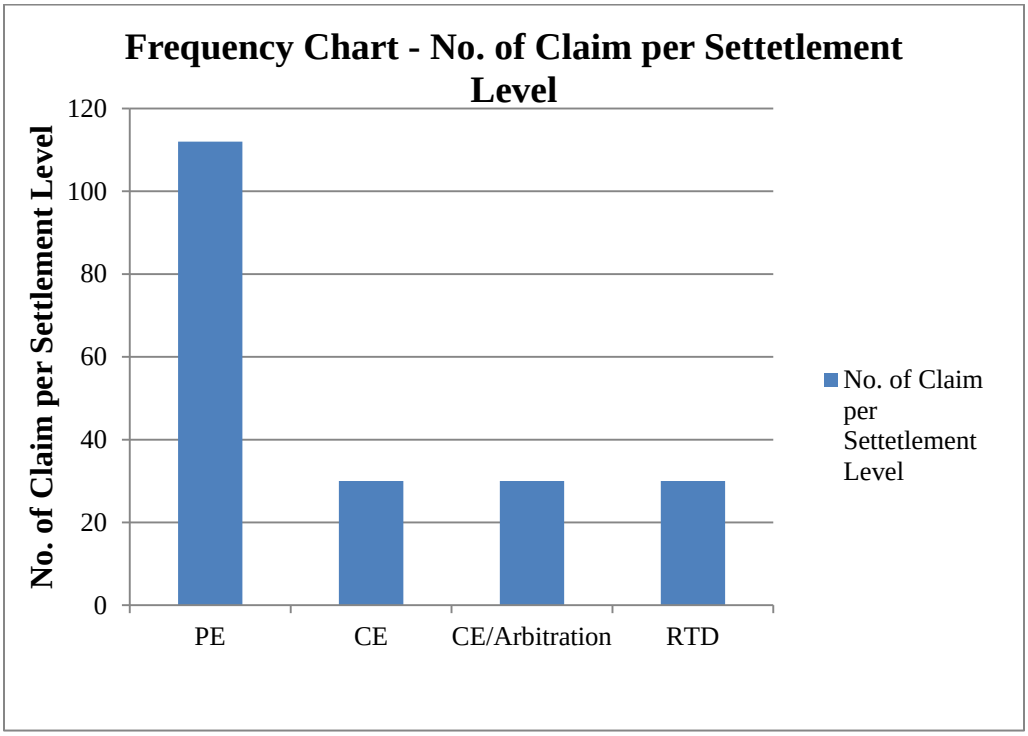


Figure 18. Frequency Chart for Claims per Settlement Level

Table 20 and figure 18 shows that most of the claims have been settled within PE-level which is somehow a healthy sign for resolving most of the claims at a lower level. However; there are still about 45% of the claims that were escalated to higher levels. Another surprising observation is that the rest of claims were resolved and settled in almost perfectly equally ratios between the other three categories of settlement levels.

Logistic Regression Analysis

Logistic regression was used to determine the parameters that can affect the claim occurrence/outcomes (claims or no-claims). The SPSS statistics program was utilized in the analysis and the test is to examine all of the parameters simultaneously on claims occurrence to determine the significant factors.

The analysis was performed on the data set described in the methodology chapter. The results are organized with the significant factors and the values of their coefficients (**β**), standard error (S.E) and significance levels (P-values). The model utilized the list of claim parameters in Table 21.

Table 21. Claim Parameters used in the Logistic Regression Analysis

Claim parameters used	**Total projects used in the analysis**
Location (CDOT Region)	780 total Projects analyzed with 62 Claim-contained projects
Budget Variation	
Schedule Variation	
Schedule type	
Scope of work	
Road type (material)	

After the analysis of the claim parameters mentioned above, the results were tabulated as shown in Table 22, which shows that only one of the six claim parameters had significance (sig.value <0.01 level) on the claims existence , which is the schedule variation parameter.

Table 22. Logistic Regression Main Results

Claim parameters examined	Coefficient values	Standard Error (S.E)	Sig. P-values
Region	.044	.088	.621
BudgetVar	.017	.136	.900
SchdVar	.425	.131	.001
SchdType	-.728	.437	.096
Scope	.075	.064	.241
RdType	.100	.184	.586

The values in the table can be explained as follows:

A positive coefficient on any factor suggests that an increase in it yields a higher probability of a positive claim outcome and the negative coefficient suggests that an increase in it yields the opposite, or a higher probability of a negative outcome. The standard error is the standard deviation of the error in the sample mean relative to the true mean, or the difference between the estimate and the true value. It measures the precision with which an estimate from one sample approximates the true population value and the lower the standard error, the better fit the model shows. The P-value is a measure of the evidence against the null hypothesis and how likely we are to get a more extreme result, assuming the null hypothesis is true. If the P-value is less than or equal to the type 1 error rate α then the null hypothesis is rejected.

The results show that when a project has a higher schedule variation, it was more likely that a claim would occur in this project (Coefficient B = 0.425). This statistic is supported by the percentage and the frequency chart where most of the claim basis leaned towards the schedules and delay issues. The schedule variation has a St. error of 0.131 and a significant P-value (<0.01) which also support the significance relationship between the schedule variation and the claim occurrence.

Correlation analysis

A Correlation matrix analysis was performed using the SPSS software on the same variables that were used in the regression analysis as listed in Table 21. Most of the variables are measured in an ordinal scale measures with the exception of the claim variable which is a dichotomous variables which is measured in a nominal scale measurement. A Spearman Rho (r_s) correlation non-parametric statistical analysis was used rather than a Pearson correlation type since most of the correlations of the variables in the analysis do not have to have a linear relationship.

The table in Appendix E provides descriptive statistics (mean, standard deviation, and N) for the variables to be correlated. The appendix also contains the correlation matrix table to show the Spearman correlation coefficients and the two tailed significance levels. As an example, the Spearman correlation coefficient between budget variation and schedule variation is 0.29; the significance value is < 0.0001. So the correlation between the budget variation and schedule variation is statistically significant because the sig. value < 0.01. Thus, we can state that there is an association between budget variation and schedule variation. Since the correlation is positive so the more variation in the schedule, the more the budget variation in a project. And

the same interpretation could be applied to the rest of the variables in the table. However, there are a number of relationships that are mentioned in Table 23 which are significant but do not possess high strength relationships based on their low scores of Spearman's coefficients.

Table 23 shows the relationship between the claims and claim parameters, where the first two columns describe the correlated variables, the third column is the Significance value of the relationships (X< 0.01), and the last column on the right is the Spearman correlation coefficient which indicates the degree of the association (correlation) between the variables in the table.

Table 23. Correlation Analysis Main Results

Variable 1	Variable 2	Sig. value (P-value)	Spearman Coefficient (r_s)
Claims	Schedule Variation	0.001	0.131
Region	Budget Variation	< 0.0001	- 0.18
Region	Schedule Variation	0.002	- 0.126
Region	Road type	0.005	0.113
Budget Variation	Schedule Variation	< 0.0001	0.29
Budget Variation	Scope type	0.013	0.1
Schedule Variation	Schedule type	< 0.0001	0.2
Schedule type	Scope type	0.002	0.122
Scope type	Road type	< 0.0001	0.24

Based on the result in Table 23, the results show nine statistically significant relationships. However, only one has a medium relationship strength (association), which is the budget variation and the schedule variation with a Spearman coefficient $r_s = 0.29$, $P < .01$. This relationship was the most important outcome shown on Table 23 since it provides grounds to answer certain research questions about the cost and time relationships which will be later addressed in the conclusion chapter.

Other significant relationships can be easily explained. For example, schedule variations were the sole significant claim parameter established in the regression analysis and it is logical that it showed in the correlation analysis to be the only variable that has significance association with claims. The weakness of association represented in the Spearman coefficient can be explained by the nominality of the claim variable in a correlation statistic which does not serve the formation of a trend between the variables. The association between scope type and road type can be easily recognized since most of the resurfacing projects are associated with the asphalt road types.

Case Study

The initial design of the research focused on the statistical analysis, but it was apparent that the many variables and scenarios might require amplification and clarification through a case study to help lead to a claims management system focusing on delays.

Scheduling methods are particularly important because both parties can manipulate them to gain an advantage on a delay claim. Therefore, the case study will demonstrate methods and results for different forensic scheduling techniques and costs associated with delays. The details of the case study are in Appendix F.

The schedule delays scenario will be demonstrated within an as-built schedule. Using methodologies of schedule analysis that were explained in Chapter 2, the analysis will showcase differences, advantages and pitfalls in the different methods and techniques. Associated costs will be calculated using techniques that were also explained in Chapter 2. Figure 19 shows the logic of the claim case study and the interaction of its cost and schedule constituents.

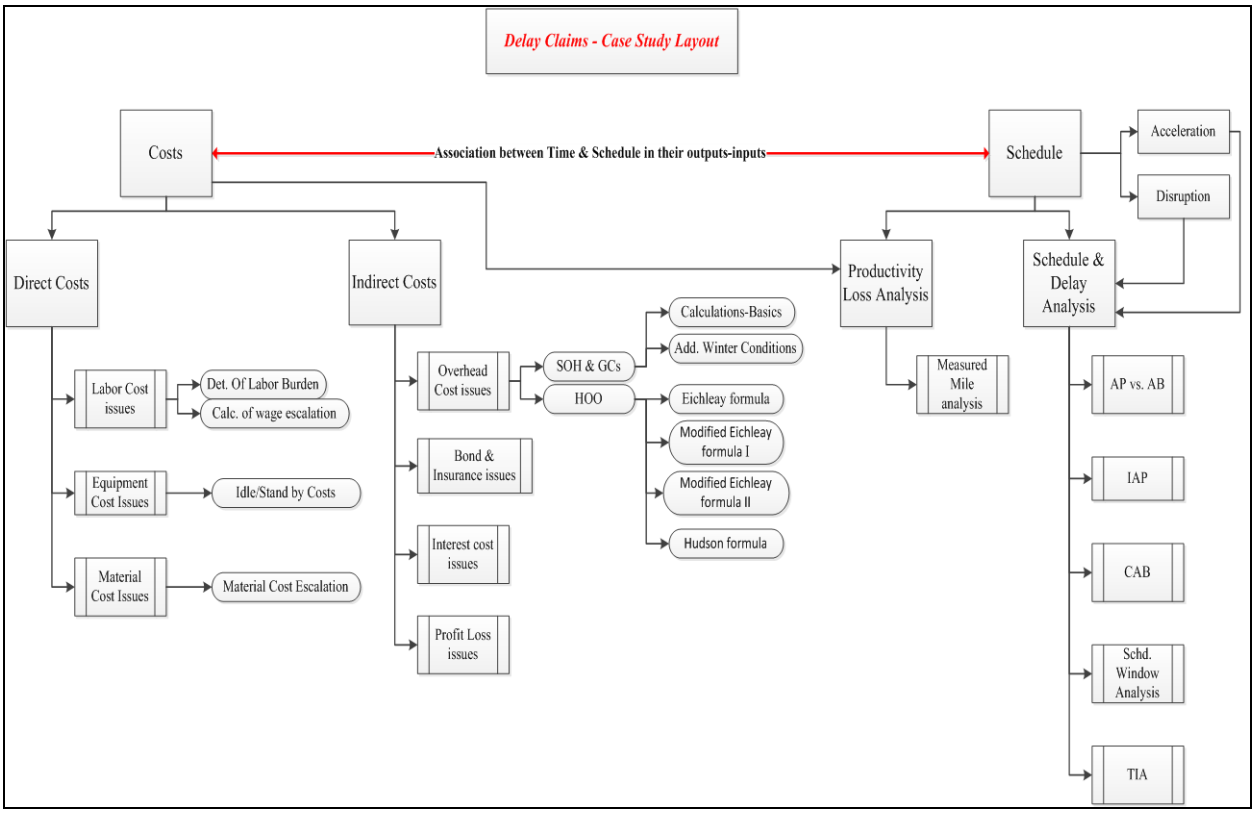


Figure 19. Case Study Methodologies Layout

Case Study Overview

To create a realistic scenario, the case study will take on construction of a pre-cast bridge in Boston, Massachusetts where the main parties are the owner (Massachusetts Department of Transportation or MassDOT) and an anonymous contractor.

Project Facts and General Scope

The project involves a small bridge of about 350 feet in length and 60 feet in width. It consists of two lanes and a sidewalk both ways with total area of approximately 21,000 SF (2334 SY). The project start date is May 12, 2013. The project scope consists of precast abutments, steel beams and precast slab decks topped by pavement. The scope also includes excavation, backfilling and grading along with limited landscaping. Other obligatory preconstruction

activities also include storm water protection, water control measures, and signage and shoring systems. Demolition of sub and super structures and repair of an underground drainage structure are also required. Utility relocation is not in the scope for the bridge contractor and is the responsibility of the owner to coordinate and complete. The total project consists of 73 different activities divided into the following types:

- 3 Milestone Activities
- 31 Preconstruction activities
- 1 Utility relocation activity
- 38 Construction activities

Cost Assumptions

The total project cost was originally estimated at $3,348,851, including the construction and preconstruction activities (Table 24). The items that have two different phases divided equally between the phases.

There is an assumption that some union labor wages and some materials costs will escalate around November 9, 2013 which will be the project end date.

Table 24. Simplified Itemized Project Costs

Item	Total Cost
Contractor Mobilize	$ 200,000
Install SWPPP Systems	$ 51,724
Set Project Limit Signs	$ 7,000
Approach Work - Raise Grades	$ 58,560
Repair Underground Drainage Structure	$ 40,000
Backfill & Grade	$ 27,000
Install Traffic Devices, Barriers, Signage	$ 25,170
Install Temporary Shielding	$ 77,280
Install Landscape, Sod, Etc.	$ 25,000
Demo Existing Superstructure	$ 50,000
Environmental Protection of Box Turtles	$ 6,000
Install Water Control Measures	$ 57,000
Excavate Abutments & Surrounding Area	$ 34,694
Demo Existing Substructure	$ 19,800
Set & Grout Precast Abutments	$ 500,000
Install Steel Beams	$ 539,184
Install Precast Decks	$ 1,365,000
Grout Precast Decks	$ 20,000
Pour Sidewalks	$ 7,200
Install Railings	$ 52,500
Install waterproofing	$ 147,000
Place Temp Pavement	$ 31,739
Install Pavement Markers, Sign and Stripe	$ 7,000
Total	**$ 3,348,851**

With a start date of May 12, 2013 and finish date of November 4, 2013 the project planned duration will be 176 days. The as-planned schedule is shown in Appendix F (Figure 38).

Schedule delays scenario

In the schedule delays scenario, several delays occurred during project construction and pushed the finish date to November 19, 2013 which stretched the project duration from 176 to 191 days.

The delays were:

1- Owner Delay: Review & Approval of Pre-cast Deck Shop Drawings ***(defective Specs)*** – 7 days.

2- Owner Delay: Utility Relocations on neighboring project ***(Utility Relocation)*** – 22 days.

3- Contractor Delay: Late fabrication and delivery of Pre-Cast Decks ***(Late Delivery)*** – 5 days.

4- Owner Delay: Disruption causing crane-position closure during the steel beams installation ***(Owner Disruption)*** – 1 to 2 Days.

5- Contractor Delay: Alternative crane usage for OSHA safety factors ***(Equipment availability)*** – 5days.

6- Weather Delays: Weather delays right before backfilling and grading activities ***(Weather Delays)*** – 3 days.

Claims Calculation and evaluation

The claims calculation and evaluation are divided into two separate but dependent/correlated parts: the forensic schedule analysis which proves the time that qualifies as an entitled delay duration and the pricing components of this delay accordingly.

The schedule delays will be analyzed according to several different analytical methods as in the following:

1- As-Planned (AP) Vs. As-Built (AB) analytical method

2- Impacted As-Planned (IAP) analytical method

3- Collapsed As-Built Method (CAB) analytical method

4- Schedule Window Analysis (SWA) analytical method

5- Time Impact Analysis (TIA) analytical method

The Cost Analysis will address the Components of cost for the qualified delays based on the schedule analysis. The cost components are: labor, equipment, material, overhead, and lost productivity (See Appendix F).

Table 25 outlines a summary of the delays described above.

Table 25. Delays encountered in the project per Activity

P6 Activ. ID	Activity Name	Orig .dur.	Predec essors	Delay Time (days)	New dur.	Delay Type	Responsible Party
U120	Utility Relocation	67	NTP	22	89	Utility Conflicts	Owner
P670	Review & Approve - Precast Deck Shop Dwgs.	30	P660	7	37	Late Approval/Defectiv e Specs	Owner
P680	Fabrication & Delivery - Precast Deck	55	P670	5	60	Late Delivery	Contractor
C815	Set & Grout Precast Abutments - P2SA SB	5	C805	5	10	Unavailable Equipment	Contractor
C320	Backfill & Grade - P2SC SB RDWY	12	C200	3	15	Weather Conditions - Excusable	Excusable
C525	Install Steel Beams - P1SB NB	7	P610, P480, C515	2	9	Crane Position - Owner Disruption	Owner

The table classifies each delay according to the activity's P6 ID and its duration in the original schedule. Then it states each activity's predecessor activities according to the schedule and the delay for each activity. The last two columns show the delay type and party responsible.

AP vs. AB Schedule analysis – Net Impact Method

By Using the As-planned and As-Built schedules in Appendix F (Figures 38 & 39). The results using those schedules are the total delay duration entitled was calculated as in the

following: Total Entitled delay duration = AB schedule duration – AP schedule duration = 191 days- 176 days; Therefore, the total delay duration entitled is ***15 days***.

Impacted As-planned (IAP) schedule analysis – What-If or "Adjusted AP"

The results for the IAP method is calculated using the AB schedule which includes all the delays and an AP-schedule which includes only the contractor's delays as in Appendix F (Figure 40).

From the results of the two schedules, the total delay duration entitled is calculated as in the following: Total Entitled delay duration = AB schedule duration – IAP schedule duration (including only contractor's delays) = 191 days – 181 days; Therefore, the total delay duration entitled is ***10 days***.

Collapsed As-Built (CAB) schedule analysis – But For or "Adjusted Baseline"

The result of this analytical method is evaluated through different schedules as shown in Appendix F. After all the above schedules are created, the delay duration entitled is calculated according to the following simple equations:

AB = AP + Contractor Delays + Owner Delays + Time extension; *Solve for Contractor's delay*

Owner Delays = AB – But for Owner's delays

Time Extension = But for Owner's delays – But for Owner & Excusable delays

Total delay duration Entitled = AB – AP- Contractor's delay

After creating both schedules as in Appendix F (Figures 41 & 42), the entitlement calculations can be calculated with the equations available as in the following:

Owner Delays = AB – But for Owner's delays = 191 – 184 = 7 days

Time Extension = But for Owner's delays - But for Owner & excusable delays = 184 – 181 = 3 days.

AB = AP + Contractor Delays + Owner Delays + Time Extension

191 = 176 + Solve X + 7 + 3

Solving for (X), Contractor's delay = 5 days

Therefore, Total Delay duration entitled = AB – AP – Contractor's delays = 191 – 176 – 5 = ***10 days.***

Schedule Window Analysis

A window schedule analysis was completed by taking several snapshots to analyze specific time periods within the schedule (see Appendix F, Figures 43 to 46). The results are presented in Figure 20. The following figure shows the original as-planned schedule, the analysis per each window and its cumulative results for each later window and finally, it shows the total as-built schedule with all the different window delay effects plugged in its overall duration.

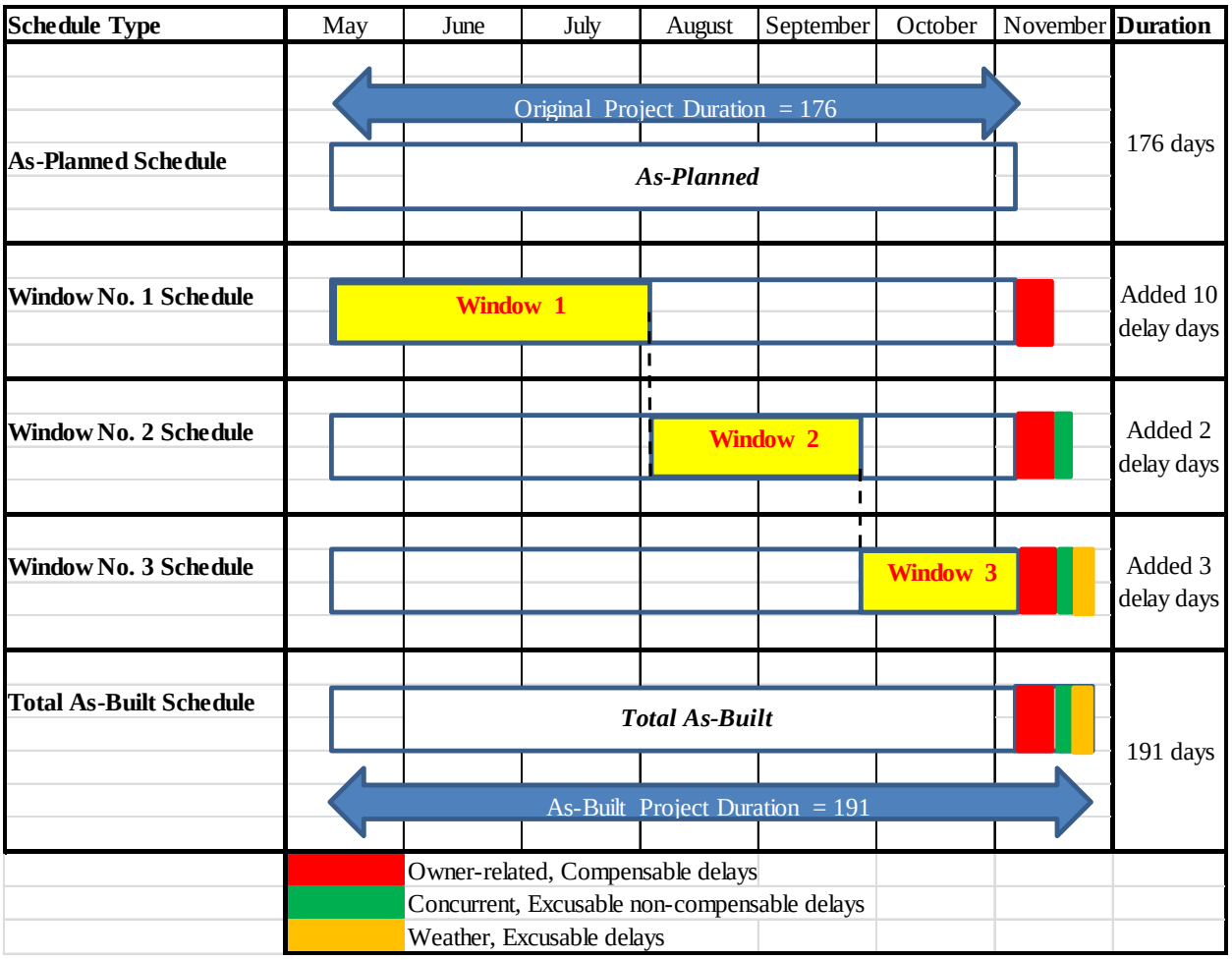


Figure 20. Summary of the Window Analysis Results

Time Impact Analysis

Time impact analysis is a method that works using the as-planned schedule and updates it instantly as soon as any delay, change or disruption calls for a schedule impact analysis, in a very active real-time manner. As was previously explained in detail, the TIA is one of the most reliable and accurate methods which take into account the effect of each impact happening in the project as an individual activity. In this case, all the six delays will be analyzed for their impacts as shown in Appendix F (Figures 47 to 51) and summarized here as shown in Table 26.

Table 26. Summary of Time Impact Analysis (TIA) method

Impacts No.	delay duration (days)	Change in C.P	Responsibility	Preliminary status
After Impact #1 analysis	5	N	Owner	Compensable
After Impact #2 analysis	5	Y	Owner	Compensable
After Impact #3&4 analysis	2	N	Owner	Compensable
After Impact #5 analysis	0	N	None	
After Impact #6 analysis	3	N	Weather	Excusable
***Total Delay duration Entitled* =**	12	days		

Final TIA Results

The overall entitled compensable delays are the sum of the analysis of the final results from all those impacts. In this case, the compensable delays are 12 days and three days of weather-excusable delays.

Summary of Schedule Analysis

All the results from the previous five types of schedule analysis were summarized and tabulated in Table 27. Table 27 describes each technique's time entitlement duration, along with every aspect of the delay according to causality and compensability. However, the net impact method and the IAP do not have the ability to separate delays according to these parameters since they just adjust total duration and they do not anticipate concurrency and responsibility of delays.

Table 27. Demonstration of the overall results of the different schedule results from the different scheduling techniques used in the case study

Schedule Analysis Techniques	Time entitlement	Compensable Owner-Caused	Inexcusable Contractor Caused	Excusable
AP vs. AB - Net Impact Method	15	N/A	N/A	N/A
IAP, What If, Adjusted AP	10	N/A	N/A	N/A
CAB, But For, Adjusted Baseline	10	10	0	5 (2 concurrent, 3 Weather)
Window Schedule Analysis	10	10	0	5 (2 concurrent, 3 Weather)
Time Impact Analysis	12	12	0	3 (Weather)

From the different results represented in Table 27, it is very obvious that different methods can yield different results within the same case. That is because some of them do not account for certain parameters as concurrency, delay responsibility, or the sequence that the delays occur within the construction process. This is a simple yet very strong evidence of how manipulative the claim analysis can be, and there is a desperate need for standardization of the schedule delay analysis within the delay claim management process. There is also a need to stick with the current best practice methodology represented in the TIA.

This is a very critical issue since the cost associated with the delay claims will be based on the results of the schedule analysis entitlement durations. This will be shown in detail in the next section that addresses the cost analysis according to the subsequent schedule analysis results.

Cost Analysis Results – Summary

All the results from the cost analysis associated with the entitled delay were summarized and tabulated as in Table 28.

Table 28. Summary of the Total Costs related to the delay Claims in the case study

Cost Item type	Delay Costs Associated
Labor Costs	$ 864
Equipment Costs	$ 18,748
Material Costs	$ 6,400
Add. SOH / General Conditions	$ 19,449
Add. SOH - Winter Conditions	$ 9,862
Additional (HOO)	$ 15,000
Lost Productivity Costs	$ 1,158
Total delay claim costs	***$ 71,481***

According to Table 28, the total cost associated with the delay-entitled claim is $71,481.

CHAPTER FIVE: FINDINGS, DISCUSSION AND CONCLUSION

This chapter presents findings and results from Chapter 4 as aligned with the research questions in Chapter 1. It presents a set of best practices for a claim management system to address the problem of delays, and it suggests topics for future research.

Findings from CDOT data

The data from Chapter 4 show a tendency toward more claims between 2000-2005, followed by fewer claims after the new specification book of 2005. Most claims were focused in the Denver Metro Area (Region 6), which has more than 33% of the daily vehicle miles traveled and 23% of the truck vehicle miles traveled out of the six regions (CDOT Fact Book, 2011).

More claims are focused on road projects than bridge or other projects. The greatest number of claims was related to resurfacing, which is the most common type of CDOT project. This can be related to a factor inducing claims represented in the risk in overlay operations with leveling courses (Roberts, Kandhal, Brown, Lee & Kennedy, 1996).

The highest percentage of claims was focused in two main categories: the new and reconstruction work, which has large scales, budgets and variability; and the bridges and widening projects with major traffic controls, utility relocations and delays, along with right of way problems. Also, the analysis showed that fixed-date completion puts pressure on the contractor and the owner and can be an incentive for claims by the contractor and liquidated damages by the owner.

The results show that the main grounds for claims in most CDOT projects are differing site conditions, time and schedule issues, and plan or specification errors. On the basis of specifications, most claims are associated with earthwork or progress and prosecution (schedule delays). Claim basis such as site conditions and defective or revised specifications, can be easily translated into schedule delay claims. In conclusion, schedule delays are the most used claim basis and the most common ground for claims. Added items and modifications in the pay estimates did not indicate any trends in claims.

Statistical Findings

Logistic Regression Findings

Out of the six independent variables included in the regression analysis, only schedule variation had a significant impact on claims occurrence in the projects studied. This strengthens the findings that the schedule delays and work progression delays are the most common grounds for claims basis in CDOT highway projects.

Correlation Findings

The same six variables showed some significant but weak associations with the exception of the relationship between the budget and schedule variations. Generally, these show the expected association between costs and time in claims.

Cost and Resource Significance Items

Most claims were related to cost and resource items which include excavation, embankment, asphalt or concrete paving. These items normally represent most of the contract value and are on the critical path of the project schedule.

Case Study Findings

The case study showed the differences and the manipulation ability of different schedule analysis techniques based on the same delays. Therefore, there is a clear need for standardization of the methods of delay claim management. It showed how different costs can be associated with the delay claims. One party can manipulate the delay claims by using an advantageous scheduling method or the most compensation. To address this issue, the research concludes with a delay claim management system and set of best practices for owners and contractors to create a fair and proactive delay claim process and minimize disputes.

Delay Claims Management and Best Practices

A delay claim management system should detect and document delays as soon as they happen. This requires a standardized process for the owner and contractor with guidelines, limitations and obligations. It can be summarized as follows:

1- Outline scheduling specifications.

2- Establish schedule evaluation standards.

3- Define weather and unanticipated weather conditions.

4- Identify a standard method for schedule delay analysis.

5- Identify the requirements and inputs for this method.

6- Address the float issues within the construction project, and specifically the float ownership and consumption privileges. This is specific to each project or entity (e.g. CDOT) where the two parties have to agree contractually on the float ownership limitations so when a delay occur, the float consumption effect is already evaluated before evaluating the impact of the delay within the schedule.

7- Document costs associated with delay impacts.

Outlines of Scheduling Specifications and evaluation standards

There are always guidelines that are stated in the specification books of any DOT regarding the schedule as in the CDOT 2011 specification book, Section 108 that address the schedule guideline under the title of "Prosecution and Progress." In this section of the conclusion section however, the research will state only the schedule specifications that are not stated or discussed clearly in section 108. These schedule specifications can be outlined as in the following points:

1- The General Contractor (GC) has to be obliged to include and actively involve all the subcontractors and other stakeholders in the schedule development before and after submission of the original contract.
2- It is required to include any physical access and availability restraints into the project schedule and in doing so, it can be a reason for delay or disruption claims at any later time unless proven otherwise.
3- Any change orders that include any additional work or any other type of activities that will be perceived as a delay shall be included in the schedule to evaluate its impacts immediately, and the inclusion of this change order shall not be dependent on reaching a cost agreement.
4- Same as Number 3, a schedule update for a change if carried on shall not wait for the formal official approval if the Project Engineer (PE) already signed for the change or verbally ordered the contractor to carry on with the change.

5- Resources including materials, owner furnished equipment and labor should be included and incorporated as restricting constraints on the project schedule to ensure a logical, dependable sequence when the schedule is carried out through the project execution.
6- All preconstruction activities including shop drawings approval and all material and contractual submittals as well as testing durations should be included in the project schedule and treated as other activities in the project schedule in terms of updates and control of the schedule.
7- There should be no limits on the project schedule activities. It should be identified and carried on in a way that addresses all the levels of detail required by the project scope of work.
8- The Contractor shall develop another summary schedule, updated on a bi-weekly basis, or according to the project duration and phases.
9- All the updated schedules and their narratives should be submitted prior to the project or the scheduling meeting, so that it can be discussed in detail during those meetings.
10- Rapid change orders authorized by the PE should be on the highest priority list and reflected on the schedule as soon as the PE approves it.
11- Neither party should modify the scheduling network logic other than as needed, unless agreed upon or authorized by the owner.

Schedule Delay analysis standards Method

The case study and literature review showed that the time impact analysis procedure is the most time consuming yet most accurate and comprehensive schedule delay analysis method. This method is proactive since it analyzes impacts of delays chronologically and it can deal with concurrent impacts within a window option. The TIA method can be simplified and used

effectively at the lowest levels possible. Even if it is time consuming, it is not sophisticated as are other complex computerized processes like cyclic modeling techniques. The TIA method is considered forward-looking and proactive (Calvey & Winter, 2006).

Requirements and Inputs for TIA Application

Since the TIA is considered a contemporaneous analysis, it should capture the impact as soon as it happens and predict a forensic change in the schedule based on that impact. It is a CPM-based scheduling analysis and requires a CPM schedule to show the calculations and differences between an As-Planned (AP) schedule and the impacted schedule. It is based on the assumption that the most recent as-planned schedule is updated to the last moment before the analysis. The requirements can be summarized as follows:

1- The contractor and the PE should use a CPM-based schedule in planning and scheduling the project.
2- The Contractor should update the schedule in a timely manner to assure that if a delay occurs, the TIA will use the timeliest and most recent schedule. The contractor has to provide updated schedules to the PE.
3- In the case of a delay, the contractor must implement a TIA immediately to assess it and take advantage of the proactive approach. The contractor must report the results of the TIA to the PE.
4- For the Updated Schedule:
    a. Initial update is necessary if any changes or adjustments were made between the NTP (Notice to Proceed) and schedule final approval.
    b. Frequency of schedule updating should be on weekly basis or in case of any major events.

c. Obligatory joint update meetings should be in place or be part of the project weekly meetings along with other scheduling issues so all parties are on the same page regarding the schedule and the construction productivity pace.

d. SWOT analysis can be incorporated in the cases where the project is behind schedule in order to exploit opportunities in the work sequence to get back on schedule and fix much of the threats to fall further behind and mitigate the negative impacts.

5- An Impact analysis meeting should be beneficial for both parties to communicate information. This is not only helpful to take the necessary measures to account for the upcoming claim, but also to forecast and plan for future impacts and benefit from opportunities to cut on schedule or budget.

6- The TIA should include all the time and cost records to support the CPM analysis.

Weather Issues

The Weather conditions includes rain, snow, wind, and low or high temperatures that limit the construction process, slow it down or shut down and completely stop the work. For a dependable original AP schedule that should be used for future updates and time delay impacts, the schedule had to include any foreseen weather conditions. This obligates the contractor to review historical weather data according to the project's geographical location and determine the anticipated weather conditions that should be included and planned for as part of the schedule. Any other un-anticipated delays due to unforeseen weather conditions after these agreed-upon durations can be considered excusable delays.

The definition of anticipated severe weather conditions should be defined in general according to the weather severity. Most specification books (e.g. CDOT, 2011 Specifications)

specify only weather limitations per type of work (e.g. concrete placement, landscape, etc.), but there are no specifics that generally define adverse weather days. A good, simple, and usable major guideline is the Corps of Engineers major guidelines to identify severe weather conditions (USACE, 1991). The guideline uses the National Oceanic and Atmospheric Administration (NOAA) data, where the precipitation equals or exceeds .10 inches in a single day, the high temperature is 35 degrees Fahrenheit or below, or the adverse weather prevented the contractor from working on critical activities for 50% or more of the workday beyond his control (USACE, 1991). All the above weather issues can be summarized as in the following:

1- The contractor has the obligation to study the weather history of the project site according to a reference that is agreed upon from the owner's side (e.g. NOAA) and also according to the specification book weather limitations for different types of work.
2- The contractor has to provide the results of that study to the owner and report its inclusion in the calendar days of the submitted schedule that reflects those anticipated weather conditions.
3- The owner has to review and approve this as part of the schedule submitted and include it in the work control plan to monitor those conditions.
4- Any un-anticipated weather conditions which happen in excess of the durations that were accounted for in the original schedule will be considered an excusable, non-compensable delay.
5- In the case, if one of the parties (owner or contractor) is responsible for pushing the project into unanticipated weather conditions based on his previous delays, then the compensability of this weather delay has to be reviewed accordingly.

Float Issues, Ownership and Privileges

Float issues can be a very important parameter in scheduling analysis and claims. The cost and schedule claims are affected by the float ownership, the float allocation privileges and consumption (Sakka & Sayegh, 2007). The float issues have been addressed in the literature review section. However, this section will conclude the float issues by stating its types and several ownership and allocation scenarios that both parties can agree upon during the contracting time before the construction work starts and then the schedule updates, delays and impacts should be handled accordingly.

The two major types of a schedule float are the total and free float. In addition other floats can be defined as in the following:

1- Total Float (TF): defines the maximum amount of time an activity can be delayed without delaying the whole project, while the
2- Free Float (FF): defines the maximum amount of time an activity can be delayed without delaying its immediate successors.
3- Negative float: In cases where the completion date will be later than the planned completion date. This means there is less time to finish the project than required; as a result the negative float exists during the updating process.
4- Independent Float: Similar to the FF. However, the previous activity can be completed at its latest time where the minimum amount of time available to complete the activity is greater than the duration of the activity itself, this time in excess is named an independent float.

The Float Allocation scenarios can be different. However, there is no best way to make a standard so it should be used on a project to project basis but should not change within the project itself during the construction process. The favored methods that can be used in the industry are descried as in the following (Wickwire et al., 2003):

1- The Float belongs to the project and is available to the project parties on the basis that the party acts in good faith.
2- Simplified Method of allocation of the float to individual activities along each path according to the equation of

   Float Allocated = Duration of activity/Total duration of activity path x TF on the path
3- Target or conditional dates method using software, where conditions like “not earlier than,” “must-start no later than,” or “must finish,” can be used to impose limitations of the float usage on activities, between different project phases or between different subcontractors.
4- Neither the contractor nor the owner are allowed to use the float suppression techniques, such as applying specific lags for logic constraints, extended buffer in activity times, or made up imposed dates, other than the factual constraints that are naturally required under the scope of work related to the contract. Any use of the above-mentioned suppression float suppression techniques can be a cause for project schedule rejection.

Delay Claim Documentations

Documentation is the backbone of any project whether it is related to delays, costs, submittals, inspections or any related item to the activities of the work scope required to deliver the project. This is because all of the monitoring and control processes are using the project documentation as a tool during the project. It is yet more important when it comes to delays and

its compensations in a claim management system. The documentation related to the delay claims can be divided into two dependent components; scheduling documentations and cost documentations. This section will address several guidelines that have to be maintained in order to achieve detailed, accurate records that can serve as a solid basis and foundation for delay claims that are acceptable and fair to both parties.

Schedule Documentation

The schedule documentation has to address several procedures and guidelines as in the following:

1- The contractor narrative attached to each schedule update must include all the details necessary, such as, but not limited to, the impacts on the schedule in terms of the immediate tasks of the delay along with the impact of the total project, the reasons for the schedule variations, resources reallocation, critical path changes, and any other consequence related to the delay impacts during the update.

2- Daily records should be kept in a way that a factual reconstruction of the schedule can be observed from these records if needed.

3- The master summary schedule should be preserved and updated so it can be used in periodic project meetings to represent the overall status of the project.

4- Documentation of any construction equipment usage hours and its idle time along with the reasons for those idle times.

5- Documentation of any verbal or written change that have any effect on the schedule.

6- Very accurate documentation of the daily weather conditions.

7- Documentation of all inspections and testing and its duration specifics if the inspections caused delay or disruption time.

8- Record of percentage work per every active work item to account for the daily productivity for each work item and work crew. This is very important in case of disruptions that causes lost productivity. It is also to monitor the contractor productivity with reference to the industry average.

Cost Documentation

The contractor should keep and maintain daily, detailed cost records. In addition to several categories of cost records, some of the most important are as in the following:

1- The contractor has to clearly specify his budgeted labor burden in the procurement stages along with submitting a Cost breakdown structure (CBS) for the different activities in the project scope.
2- General daily production logs have to be maintained to emphasize the dollar values of the average daily work done.
3- Labor wages and wage escalation issues have to be addressed in the contractual stage and monitored through the records.
4- Material escalation issues have to be addressed in the contractual stage and monitored through the records.
5- All equipment operation and idle costs have to be kept in an hourly records basis.
6- All general conditions predetermined and submitted for approval by the owner have to be kept in a daily record basis to track down any changes in costs.
7- The original budget has to be established and approved, then updated with any impacts in the same manner the as-planned schedule is updated as mentioned in the schedule documentation section.

8- All change orders, estimates, purchase orders, payroll records, and wage agreements with labor trades have to be kept on records.

Future Research

A great deal was learned during the study, and this research can be replicated for other infrastructure industries.

While this study sought to simplify the claims management process, more sophisticated techniques can be developed to model delays to improve accuracy. Another research topic is to address the legal issues associated with this research and put it into contractual clauses. It was very clear throughout the process of collecting the data in this research that there is a great deal of research efforts that can be done to increase the efficiency and to better the record-keeping process within the infrastructure institutions (e.g. CDOT). This effort can take many forms; one is the development of new software for more document control with respect to claims that address its sources, budget and schedule effects and other.

More research efforts can also be done to address the personnel training and specifically the PE (project engineer) which is the lowest level on the project hierarchy, so that he or she can contribute efficiently and handle the best practices or a new claim management system implementation. This can be addressed by developing a course with a syllabus or several training sessions that cover the needs of the PE to develop the capability to work with the contractors within a new claims management system by the best practices and the system tools introduced within this research or others that help in proactive manner.

Last but not least, the study of the use of the Line of Balance (LOB) as a favorable scheduling technique in road construction and other infrastructure projects can be very useful.

The reason behind this is that the LOB can address a lot of productivity and zoning issues in a more realistic real-time manner which serves the purpose of this research very well as in adopting a proactive approach for delay claims and other scheduling issues.

Major Conclusions and Lessons Learned

The major conclusions and lessons learned can be aligned with the research questions.

The first conclusion addresses the relationship of cost and time in delay claims. It was proven through the statistical and case study results that time delay is a major controlling parameter for the claims costs. Although there are many parameters and causes that affect claims, the schedule variation was proven to be the strongest cause for claims. These conclusions have addressed the first and second research questions.

Another contribution from the research is the exploration of methods for schedule delay analysis and cost estimation of delay claims. While there are a number of methods, only the TIA or other more sophisticated techniques (e.g. simulation techniques) have the accuracy and the comprehensive traits to be dependable. This have answered the third research question

Addressing the fourth research question, most claims were associated with the most significant cost and resource items which were earthwork and asphalt operations.

With respect to the fifth and sixth research questions, no clear mathematical relationship can be established. This is due to the fact that construction projects are unique in nature and the delay claims vary greatly between every case. Another reason is that delay reasons are unique and varied.

As a result of the findings, the research turned to the establishment of a practical approach to create a simple delay claim management system that will work at the lowest level with simple approaches. This management system included a selection of a method (TIA) to standardize the process of delay claim management and prevent any manipulation by any party in the contract. Then, it proceeded with the requirements to implement that method of delay analysis along with several related issues as weather, project floats and schedule specifications.

Finally, the data collection process showed how even large and sophisticated institutions such as CDOT struggle with record keeping. For example, all the claims information was found in Outlook files that were based on individual efforts. If the road industry has more robust databases compared to other infrastructure industries, one can imagine how deficient the other industries are when it comes to data issues as in the case of pipe networks.

To avoid these issues on the project level, this research recommended guidelines for record keeping and documentation of schedule and costs during the project. This is not only for the delay claim analysis but also to maintain a standard of record keeping that helps the overall controlling and monitoring of the budget and schedule of projects even if there are no claim issues at all.

REFERENCES

AAA. (2012). Construction, Real Estate & Environmental. Retrieved from http://www.adr.org/aaa/faces/aoe/cre/construction;jsessionid=M5TrQhBKr29LPYQvTnmvMp92MTmS2zv6tzzmYcZf7QpSM2QB39pZ!-928932456?_afrLoop=252506273969100&_afrWindowMode=0&_afrWindowId=null#%40%3F_afrWindowId%3Dnull%26_afrLoop%3D252506273969100%26_afrWindowMode%3D0%26_adf.ctrl-state%3D5n7nc78i7_4

AACE. (2004). Estimating Lost Labor Productivity in Construction Claims. *AACE International Recommended Practices, Practice No. 25R-03*,

Abd El-Razek, M., Bassioni, H., & Mobarak, A. (2008). Causes of Delay in Building Construction Projects in Egypt. *Journal of Construction Engineering and Management, 134*(11), 831-841.

Abdul-Malak, M. A. U., El-Saadi, M. M. H., & Abou-Zeid, M. G. (2002). Process Model for Administrating Construction Claims. *Journal of Management in Engineering, 18*(2), 84-94.

AbouRizk, S., & Dozzi, S. (1993). Application of Computer Simulation in Resolving Construction Disputes. *Journal of Construction Engineering and Management, 119*(2), 355-373.

AbouRizk, S., Manavazhi, M., & Dozzi, P. (1997). *Analysis of productivityon a tunnel operation using computer simulation.* Paper presented at the ASCE Construction Congress V: Managing Engineered Construction in Expanding Global Markets.

Aibinu, A. A., & Jagboro, G. O. (2002). The effects of construction delays on project delivery in Nigerian construction industry. *International Journal of Project Management, 20*(8), 593-599.

Al-Gahtani, K. (2009). Float Allocation Using the Total Risk Approach. *Journal of Construction Engineering and Management, 135*(2), 88-95.

Al-Momani, A. H. (2000). Construction delay: a quantitative analysis. *International Journal of Project Management, 18*(1), 51-59.

Alkass, S., Mazerolle, M., & Harris, F. (1996). Construction delay analysis techniques. [Article]. *Construction Management & Economics, 14*(5), 375-394.

Alkass, S., Mazerolle, M., Tribaldos, E., & Harris, F. (1995). Computer aided construction delay analysis and claims preparation. *Construction Management and Economics, 13*(4), 335-352.

Allman, I. (1988). Significant Items Estimating. *Chartered Quantity Surveyor, September*, 24-25.

Alwi, S., & Hampson, K. D. (2003). *Identifying the important causes of delays in bulding construction projects.* Paper presented at the 9th East Asia-Pacific Conference on Structural Engineering and Construction.

Anastasopoulos, P., Labi, S., Bhargava, A., & Mannering, F. (2012). Empirical Assessment of the Likelihood and Duration of Highway Project Time Delays. *Journal of Construction Engineering and Management, 138*(3), 390-398.

Arcuri, F. J., & Hildreth, J. C. (2007). *The Principles of Schedule Impact Analysis*. Blacksburg, Virginia: VDOT-VT Partnership for Project Scheduling.

Arditi, D., & Pattanakitchamroon, T. (2006). Selecting a delay analysis method in resolving construction claims. *International Journal of Project Management, 24*(2), 145-155.

ASBCA (1960). Armed Services Board of Contract Appeals, Eichleay Corp., ASBCA No. 5183, 60-2 BCA 2688, aff d on reconsideration, 61-1 BCA _2894.

ASCE Report Card. (2013). from http://www.infrastructurereportcard.org/a/#p/state-facts/colorado

Asif, M., & Horner, R. M. W. (1989). *Economical Construction Design Simple Cost Model*. Paper presented at the the third Yugoslavian Symposium on the Organization of Construction.

Assaf, S. A., & Al-Hejji, S. (2006). Causes of delay in large construction projects. *International Journal of Project Management, 24*(4), 349-357.

Barrie, D. S. and B. C. Paulson (1992). Professional Construction Management, McGraw-Hill.

Bernard, P. D. (2005). Staking Your Claim: Effective Claim Resolution. *AACE International Transactions*,

Block, K. M. (2007). Contractual Treatments of Delay Damages. *New York Law Journal*.

BLS. (2008). How to Use the Employment Cost Index for Escalation. In U. S. D. o. L. Office of Compensation and Working Conditions (Ed.). Washington, DC: Bureau of Labor Statistics.

Bramble, B. B., & Callahan, M. T. (2011). *Construction Delay Claims* (4th ed.): Aspen Publishers.

Burke, T. J. (1991). *Productivity Loss Claims*. Paper presented at the Second Annual Northeast Surety & Fidelity Claims Conference.

Calvey, T. T., & Winter, R. M. (2006). TIME IMPACT ANALYSIS – AS APPLIED IN CONSTRUCTION. AACE International Recommended Practice No. 52R-06.

Capital Electric Company, GSBCA 5316, GSBCA 5317, 83-2 BCA ¶ 16548 (1984)

CaplickiIII, E. V. (2003). Lost Producivity Claims on Construction Projects. Journal of Construction Accounting and Taxation, 13(2), 20-31.

CDOT Fact Book. (2011).http://www.coloradodot.info/library/FactBook/FactBook2011/view.

CEIM-Reporter. (2010). Factors Causing Delay In Construction Projects: A Case Study Of Commercial Construction Project In Ho Chi Minh City http://professionalprojectmanagement.blogspot.com/2010/08/factors-causing-delay-in-construction.html

Chan, D. W. M., & Kumaraswamy, M. M. (1997). A comparative study of causes of time overruns in Hong Kong construction projects. *International Journal of Project Management, 15*(1), 55-63.

Choate, P. A. T., & Walter, S. (1981). AT HOME: America in Ruins. *Challenge, 24*(4), 53-57.

Choate, P., & Walter, S. (1981). America in Ruins: The Decaying Infrastructure Duke Univ Pr (Tx).

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied Multiple Regression - Correlation Analysis for the Behavioral Sciences* (Third ed.): Lawrence Erlbaum Associates, Inc.

Construction Claims Monthly (2000). Measuring Lost Profit. Construction Claims Monthly http://www.constructionclaimsmonthly.org/948-measuring-lost-profit.html

Creswell, J. W. (2008). *Educational Research - Planning, Conducting, and Evaluating Quanititative and Qualitative Research* (Third ed.): Pearson Education Ltd.

Cull, R. M. J., & Travers, D. H. (2009). Claims For Lost Profits Given New Life in Termination Context. *CIM Construction Journal, 88*.

Cushman, R. F., Carter, J. D., Gorman, P. J., & Coppi, D. F. (2001). *Proving and pricing construction claims*. Gaithersburg, MD: Aspen Law & Business.

Dalton, D., & Shehadeh, N. (1992). *STATISTICAL MODELLING OF CLAIMS PROCEDURES AND CONSTRUCTION CONFLICTS.* Paper presented at the First International Construction Management Conference.

Darbyshire, G. M. (1982). Home Office Overhead as Damages for Construction Delays. *Ga. L. Rev.* (17), 761.

Davenport, P. (2006). *Construction Claims* (Second ed.). Sydney, Australia: The Federation Press.

Dembe, A. E., Erickson, J. B., Delbos, R. G., & Banks, S. M. (2005). The impact of overtime and long work hours on occupational injuries and illnesses: new evidence from the United States. *Occupational and Environmental Medicine, 62*(9), 588-597.

Diekmann, J. E., & Nelson, M. C. (1985). Construction Claims: Frequency and Severity. *Journal of Construction Engineering and Management, 111*(1), 74-81.

Dmaidi, N. (2003a). Resource Significant Cost and Time Models for Buildings Projects. *An-Najah Univ. Journal of Research (N.Sc), 17*(2).

Dmaidi, N. (2003b). The State of the Art in Integration of Cost and Time Models. *An-Najah Univ. Journal of Research (N.Sc), 17*(1).

DPAP. (2013). Analyzing Direct Labor Costs -Defense Procurement and Aquisitin Policy Defence Pricing (DPAP), *Contract Pricing Finance Guide* (Vol. Ch.7).

Ellis, R., & Thomas, R. (2002). *The root causes of delays in highway construction*. Paper presented at the Annual Meeting of the Transportation Research Board, National Research Council.

Ernstrom, J. W., & Essler, K. S. (1982). Beyond the Eichleay Formula: Resurrecting Home Office Overhead Claims. *The Constrcution Lawyer*.

FHWA. (2001). *Code of Federal Regulations, Section 635.102 - Definitions*.

FHWA. (2012). CONTRACTING Options and FHWA Approval Retrieved May 2012, from http://ntl.bts.gov/lib/jpodocs/repts_te/3029/chap4.htm

Finke, M. R. (1998). A better way to estimate and mitigate disruption. *Journal of construction engineering and management, 124*(6), 490-497.

Finke, M. R. (2000). Schedule Density as a Tool for Pricing Compensable Float Consumption. [Article]. *Cost Engineering, 42*(6), 34.

Flyvbjerg, B., Holm, M. S., & Buhl, S. (2002). Underestimating Costs in Public Works Projects: Error or Lie? *Journal of the American Planning Association, 68*(3), 279-295.

Flyvbjerg, B., Holm, M. K., & Buhl, S. L. (2004). What Causes Cost Overrun in Transport Infrastructure Projects? *Transport Reviews, 24*(1), 3-18.

Fordham, G. L. (2012). Pricing Changes and Claims in Government Contracts. Retrieved from http://www.knfcon.com/newsroom/archive/pricing_changes_claims.html

Gavin, D.G. (2001). Disruption Claims: Proving and Pricing Constrcution Claims, 3rd Edition, Aspen Law & Business.

Gramlich, E. M. (1994). Infrastructure Investment: A Review Essay. *Journal of Economic Literature, 32*(3), 1176-1196.

GSA. (2009). Federal Register. *74*(6).

Guevara, M. (2013). Lost Productivity Claims: Coming to an Owner's Defense. *Construction Claims Newsletters, ARCADIS*. Retrieved from http://www.arcadis-us.com/Lost_Productivity_Construction_Claims_Owner_Defense.aspx

Gunduz, M. (2004). A quantitative approach for evaluation of negative impact of overmanning on electrical and mechanical projects. *Building and Environment, 39*(5), 581-587.

Hackney, J. W. (1997). *Control and Management of Capital Projects* (2nd ed.): AACE International.

Hale, D. R., Shrestha, P. P., Gibson, J. G. E., & Migliaccio,G.C. (2009). Empirical Comparison of Design/Build and Design/Bid/Build Project Delivery Methods. *Journal of Construction Engineering and Management, 135*(7), 579-587.

Halligan, D., Hester, W., & Thomas, H. (1987). Managing Unforeseen Site Conditions. *Journal of Construction Engineering and Management, 113*(2), 273-287.

Hammer, F. (2008). *Overheads are not just a Cost.* University of Pretoria.

Hancher, D. E. (1999). Contracting methods for highway construction. *Transportation Research Board, Washington D.C.*

Hancher, D. E., & Abd-Elkhalek, H. A. (1998). The effect of hot weather on constructive labor productivity and costs. [Article]. *Cost Engineering, 40*(4), 32.

Hanna, A., Camlic, R., Peterson, P., & Nordheim, E. (2002). Quantitative Definition of Projects Impacted by Change Orders. *Journal of Construction Engineering and Management, 128*(1), 57-64.

Hanna, A., Lotfallah, W., & Lee, M. (2002). Statistical-Fuzzy Approach to Quantify Cumulative Impact of Change Orders. *Journal of Computing in Civil Engineering, 16*(4), 252-258.

Hanna, A., Taylor, C., & Sullivan, K. (2005). Impact of Extended Overtime on Construction Labor Productivity. *Journal of Construction Engineering and Management, 131*(6), 734-739.

Hanna, A. S., Chang, C.-K., Sullivan, K. T., & Lackney, J. A. (2005). Shift Work Impact on Construction Labor Productivity *Construction Research Congress 2005* (pp. 1-9): American Society of Civil Engineers.

Haseeb, M., Xinhai-Lu, Bibi, A., Maloof-ud-Dyian, & Rabbani, W. (2011). PROBLEMS OF PROJECTS AND EFFECTS OF DELAYS IN THE CONSTRUCTION INDUSTRY OF PAKISTAN. *Australian Journal of Business and Management Research, 1*(5), 41-50.

Hegazy, T., & Zhang, K. (2005). Daily Windows Delay Analysis. *Journal of Construction Engineering and Management, 131*(5), 505-512.

Henschel, B. A., & Hildreth, J. C. (2007). *Schedule Impact Analysis Using CPM Schedules*. Blacksburg, Virginia: VDOT-VT Partnership for Project Scheduling.

Ho, H. (2009). Local Agencies and Design-Build Contracting: A Briefing Paper for Legislators and Their Staffs, *Senate Local Government Committee*. Sacramento, California.

Horner, M., Murray, M., & McLaughlin, A. (1990). BRIDGET - a cost estimating suite for highway structures. *ournal of the Institution of Highways and Transportation, 37*(5), 14-18.

Hosmer, D. W., & Lemeshow, S. (2000). *Applied Logistic Regression* (Second ed.): John Wiley & Sons, Inc.

Householder, J., & Rutland, H. (1990). Who Owns Float? *Journal of Construction Engineering and Management, 116*(1), 130-133.

Hughes, H. (1985). United States Court of Appeals, Ninth Circuit. 10 f3d 1448 smith v. hughes aircraft company hartford accident & indemnity company Nos. 91-16758, 91-16876, 91-16877, 92-15815, 92-16901 and 92-16957.

Ibbs, W., & Nguyen, L. (2007a). Alternative for Quantifying Field-Overhead Damages. *Journal of Construction Engineering and Management, 133*(10), 736-742.

Ibbs, W., & Nguyen, L. (2007b). Schedule Analysis under the Effect of Resource Allocation. *Journal of Construction Engineering and Management, 133*(2), 131-138.

Ibbs, W., Wong, C. K., & Kwak, Y. H. (2001). Project Change Management System. *Journal of Management in Engineering*.

ICE (1999). ICE Conditions of Contract 7th Edition (ICE7). London, Institution of Civil Engineers, Federation of Civil Engineering Contractors and Association of Consulting Engineers.

Ip, S. (2002). *An Overview of Construction Claims: How they arise and how to avoid them*. Paper presented at the Lorman Seminar for Construction Contracting for Public Entities.

Irwin-II, W. J. (2005). Current Issues to Watch For in Construction Claims, Part III: Overhead Claims. *Newsletter: Construction Update*. Retrieved from http://www.lorman.com/newsletter/article.php?article_id=81&newsletter_id=22&category_id=3

Jackson, E., & Mahoney, J. (2010). *The Design-Build Contracting Methodology for Transportation Projects: A Review of Practice and Evaluation for Connecticut Applications*. Hartford, CT: Connecticut Academy of Science & Engineering and Connecticut Department of Transportation.

Jackson, M. G., LaFraugh, C. W., & Majerus, R. P. (2001). Using Industry Studies to Quanitfy Lost Productivity. *Constrcution Briefings, West Group, A Thomson Company*,

Jergeas, G. F., & Hartman, F. T. (1994). Contractors' Construction-Claims Avoidance. *Journal of Construction Engineering and Management, 120*(3), 553-560.

Jones, R. M. (2001). Lost Productivity: Claims for the Cumulative Impact of Multiple Change Orders. *Public Contract Law Journal, 31*(1), 46.

Kaliba, C., Muya, M., & Mumba, K. (2009). Cost escalation and schedule delays in road construction projects in Zambia. *International Journal of Project Management, 27*(5), 522-531.

Kallo, G. (1996). Legal Issues: Estimating Loss of Productivity Claims. *Journal of Management in Engineering, 12*(6), 13-15.

Kao, C.-K., & Yang, J.-B. (2009). Comparison of windows-based delay analysis methods. *International Journal of Project Management, 27*(4), 408-418.

Kartam, S. (1999). Generic Methodology for Analyzing Delay Claims. *Journal of Construction Engineering and Management, 125*(6), 409-419.

Kasen, B., & Oblas, V. (1996). FEATURE: Thinking Ahead with Forward Pricing. *Journal of Management in Engineering, 12*(2), 12-16.

Kettl, D. F. (2010). The Looming Infrastructure Crisis: Financial, policy and political problems are hurting efforts to fix our infrastructure. *Potomac Chronicle* Retrieved from http://www.governing.com/columns/potomac-chronicle/The-Looming-Infrastructure-Crisis.html

Koehn, E., Young, R., Kuchar, J., & Seling, F. (1978). Cost of Delays in Construction. *Journal of the Construction Division, 104*(3), 323-331.

Korman, R. (2011). Why Sharing the Float is No Utopia, But Should Be. *Engineering News-Record*. Retrieved from http://enr.construction.com/business_management/project_delivery/2011/1219-Lost-Horizon-Why-The-Shared--Resource-Rule-For-Float-In-A-Project-Schedule-Is-A-Utopia-But-Should-Be.asp

Kraiem, Z. M., & Diekmann, J. E. (1987). Concurrent Delays in Construction Projects. *Journal of Construction Engineering and Management, 113*(4), 591-602.

Lankenau, M. J. (2003). Owner Caused Delay--Field Overhead Damages. [Article]. *Cost Engineering, 45*(9), 13.

Larkin, C. (2007). Who owns the float period ? *Constrcution Week*. Retrieved from http://www.arabianbusiness.com/who-owns-float-period--144649.html?service=printer&page=

Last, W. C. (1997). CALCULATING DELAY CLAIMS: An Overview of the Components. Retrieved from http://library.findlaw.com/2000/May/1/128083.html

Lay, M. G. and J. E. Vance (1992). Ways of the World: A History of the World's Roads and of the Vehicles That Used Them, Rutgers University Press

Lee, S. (2007). *Understanding and Quantifying the Impact of Changes on Construction Labor Productivity: Integration of Productivity Factors and Quantification Methods.* University of California, Berkeley, Berkeley, CA.

Leonard, C. A. (1998). *The effects of change orders on productivity* Unpublished MS Eng. Thesis, Concordia Univeristy, Montreal, Quebec, Canada.

Libor, M. R. (2001). OVERVIEW OF POTENTIAL CONSTRUCTION CLAIMS AND DAMAGES (pp. 58): Morgan, Lewis & Bockius LLP.

Lovejoy, V. A. (2004). Claims Schedule Development and Analysis: Collapsed As-Built Scheduling for Beginners. [Article]. *Cost Engineering, 46*(1), 27-30.

Lubka, L. P. (2005). Forget Eichleay – Extended Home Office Overhead is Recoverable in California. Retrieved from http://www.huntortmann.com/files/2037_Forget%20Eichleay.pdf

Luo, R., & Najafi, M. (2007). Productivity Study of Microtunneling Pipe Installation Using Simulation. *Journal of Infrastructure Systems, 13*(3), 247-260.

Mahamid, I., Bruland, A., & Dmaidi, N. (2012). Causes of Delay in Road Construction Projects. *Journal of Management in Engineering, 28*(3), 300-310.

Mair, A. J. (1991). *Estimating and Control of Construction Projects using Cost Significant Work Packages.* University of Dundee, Dundee, UK.

Majerowicz, W. (2001). *Schedule Analysis Techniques*. Paper presented at the 13th Annual International Integrated Program Management Conference.

Mbabazi, A., Hegazy, T., & Saccomanno, F. (2005). Modified But-For Method for Delay Analysis. *Journal of Construction Engineering and Management, 131*(10), 1142-1144.

Mccadden, S. (2006). Calculating Labor Costs. *Journal of Light Construction*.

McDonald, D. F., & Zack, J. G. (2004). *Estimating Lost Labor Productivity in Construction Claims*: AACE International Recommended Practice No. 25R, 3.

McDonald, J. H. (2008). HandBook of Biological Statistics

McFarland, M. (2013). The Standard of "Reasonable Certainty" Proves Lost Profits. *Litigation News, ABA Section of Litigation*,

McGowan, P. H. (1994). *Integrated Cost and Time Models for Measuring, Valuing and Controlling Construction Projects.* University of Dundee.

Meynaride, R. A., & Molavi, K. (2007). Defending Construction Claims. *Construction Law (Nelson Mullins LLP).*

Molloy, J. B. (2001). A formula for success. Retrieved from http://202.65.206.164/hkis/html_qsd/upload/PubConlaw/conlaw37_0.pdf

Morgan, G. A., Leech, N. L., Gloeckner, G. W., & Barrett, K. C. (2007). *SPSS for Introductory Statistics: Use and Interpretation* (Third ed.). New Jersey, US: Lawrence Erlbaum Associates Inc.

Moselhi, O., & El-Rayes, K. (2002). Analyzing Weather-Related Construction Claims. [Article]. *Cost Engineering, 44*(8), 12.

Moselhi, O., Leonard, C., & Fazio, P. (1991). Impact of change orders on construction productivity. *Canadian Journal of Civil Engineering, 18*(3), 484-492.

Mubarak, S. (2010). *Construction Project Scheduling and Control* (Second ed.). New Jersy: John Wilry & Sons, Inc.

Ndekugri, I., & Russell, V. (2006). Disputing the existence of a dispute as a strategy for avoiding construction adjudication. *Engineering, Construction and Architectural Management, 13*(4), 380-395.

Nguyen, L., & Ibbs, W. (2008). FLORA: New Forensic Schedule Analysis Technique. *Journal of Construction Engineering and Management, 134*(7), 483-491.

Nguyen, L., Kneppers, J., García de Soto, B., & Ibbs, W. (2010). Analysis of Adverse Weather for Excusable Delays. *Journal of Construction Engineering and Management, 136*(12), 1258-1267.

Nguyen, L. D. (2007). *The Dynamic Floats, Logic, Resource Allocation and Delay Timing in Forensic Schedule Analysis and Construction Delay Claims.* Unpublished Dissertation, University of California, Berkeley, Berkeley, California.

Nicolich, J. G. (2012). Protecting Claims for Lost profits when Drafting Contractual Provisions that Limit Liability. *Legal News*,

Odeh, A. M., & Battaineh, H. T. (2002). Causes of construction delay: traditional contracts. *International Journal of Project Management, 20*(1), 67-73.

Oliveros, A., & Fayek, A. (2005). Fuzzy Logic Approach for Activity Delay Analysis and Schedule Updating. *Journal of Construction Engineering and Management, 131*(1), 42-51.

Overcash, A. L., & Harris, J. W. (2005). Measuring the Contractor's Damages by Actual Costs-Can It Be Done. *Construction Law, 25*(4), 31-39.

McGowan,P.H., Horner R.M.W., Zakieh R., Jones D., & Thompson P.A.. (1992, 25–27 September). *The Role fo Integrated Cost and Time Models in Conflict Resolution, Construction Conflict Management and Resolution.* Paper presented at the First International Construction Management Conference, The University of Manchester Institute of Science and Technology (UMIST),.

Peurifoy, R., Schexnayder, C. J., Schmitt, R., & Shapira, A. (2010). *Construction Planning, Equipment, and Methods*: McGraw-Hill Companies,Inc.

PMI. (2008). *A Guide to the Project Management Body of Knowledge (PMBOK® Guide) - Fourth Edition*: Project Management Institute.

Pollack, R. A., Bouchner, S. M., Enos, C. M., Johns, C. A., & Moyl, J. D. (2006). *Calculating Lost Profits*. New York, NY: American Institute of Certified Public Accountants, Inc.

Pourrostam, T., & Ismail, A. (2011). Significant Factors Causing and Effects of Delay in Iranian Construction Projects. *Australian Journal of Basic & Applied Sciences, 5*(7), 450.

Ramsey, V. (2007). *Construction Law Handbook* (2007 ed.). London, UK: Thomas Telford Limited.

Rannestad, J. (2011). Equipment Costs, Cost Guides and Claims. *Constrcution Claims Solutions*. Retrieved from http://www.arcadis-us.com/Equipment_Costs_Cost_Guides_Claims.aspx

Reid, A., & Ellis, R. C. T. (2007). Common sense applied to the definition of a dispute. *Structural Survey, 25*(3/4), 239-252.

Reid, R. L. (2008). SPECIAL REPORT: The Infrastructure Crisis. *Civil Engineering Magazine, 78*.

Revay, S. G. (1993). Can construction claims be avoided? *Building Research & Information, 21*(1), 56-58.

Rinaldi, S. M., Peerenboom, J. P., & Kelly, T. K. (2001). Identifying, Understanding, and Analyzing Critical Infrastructure Interdependencies. *IEEE control systems magazine., 21(6)*, 11-25.

Roberts, F.L., Kandhal, P.S., Brown, E.R., Lee, D., and Kennedy, T.W. (1996). Hot mix Asphalt materials, mixtures, mixture design and construction, NAPA Education Foundation, Md.

Rodriguez, J. (2013). Eichleay Formula for Extended Overhead. *Constrcution Guide*. Retrieved from http://construction.about.com/od/Claims-Management/a/Eichleay-Formula-For-Extended-Overhead.htm

Saket, M. M. (1986). *Cost-significance Applied to Estimating and Control of Construction Projects*: University of Dundee.

Sakka, Z., & El-Sayegh, S. (2007). Float Consumption Impact on Cost and Schedule in the Construction Industry. *Journal of Construction Engineering and Management, 133*(2), 124-130.

Saunders, H. T. (1993). What Infrastructure crisis? *National Affairs*(110).

Schwartzkopf, W. (2004). *Calculating Lost Labor Productivity in Construction Claims* (Second ed.). New York, NY: Aspen Publishers, Inc.

Schwartzkopf, W. and J. J. McNamara (2001). Calculating Construction Damages, Aspen Law & Business.

Shwartzkopf, W., Mcnamara, J. J., & Hoffar, J. F. (1992). *Calculating Construction Damages*. New Jersey, U.S: John Wiley & Sons Inc.

Semple, C., Hartman, F., & Jergeas, G. (1994). Construction Claims and Disputes: Causes and Cost/Time Overruns. *Journal of Construction Engineering and Management, 120*(4), 785-795.

Shi, J., Cheung, S., & Arditi, D. (2001). Construction Delay Computation Method. *Journal of Construction Engineering and Management, 127*(1), 60-65.

Shr, J.-F., & Chen, W.-T. (2006). Functional Model of Cost and Time for Highway Construction Projects *Journal of Marine Science and Technology, Vol. 14*(No. 3), 127-138.

Shrestha, P. P., O'Connor, J. T., & Gibson, J. G. E. (2012). Performance Comparison of Large Design-Build and Design-Bid-Build Highway Projects. *Journal of Construction Engineering and Management, 138*(1), 1-13.

Shumway, R., Richard, A., & Ritti, J. (2004). New Trends and Bad Results in Construction Contracts, Part I. *Leadership and Management in Engineering, 4*(3), 93-98.

SILVERBERG, K. (2003). Construction Contract Damages: A Critical Analysis of the "Total Cost" Method of Valuing Damages for "Extra Work". *CONSTRUCTION CONTRACT DAMAGES*, 36

Stumpf, G. F. (2000). Schedule Delay Analysis. [Article]. *Cost Engineering, 42*(7), 32.

Taam, T., & Singh, A. (2003). Unabsorbed Overhead and the Eichleay Formula. *Journal of Professional Issues in Engineering Education and Practice, 129*(4), 234-245.

Table-of-Cases. (1986). Cooperstein v. Patrician Estates, 117 A.D.2d 774, 499 N.Y.S.2d 423 (2d Dept. 1986).

Tatom, J. A. (1996). Is an Infrastructure Crisis Lowering the Nation's Productivity? : Inter-university Consortium for Political and Social Research (ICPSR) [distributor].

Thomas, H. (2000). Schedule Acceleration, Work Flow, and Labor Productivity. *Journal of Construction Engineering and Management, 126*(4), 261-267.

Thomas, H. (2009). Construction Learning Curves. *Practice Periodical on Structural Design and Construction, 14*(1), 14-20.

Thomas, H., Mathews, C., & Ward, J. (1986). Learning Curve Models of Construction Productivity. *Journal of Construction Engineering and Management, 112*(2), 245-258.

Thomas, H. R., Hester, W. T., Hunter, J. M., & Logan, P. A. (1985). *Comparative Analysis of Time and Schedule performance on Highway Construction Projects Involving Contract Claim*. Washington, D.C.: FHWA.

Thomas, H. R., & Napolitan, C. L. (1995). Quantitative effects of construction changes on labor productivity. *Journal of construction engineering and management, 121*(3), 290-296.

Thomas, H. R., & Raynar, K. A. (1997). Scheduled overtime and labor productivity: quantitative analysis. *Journal of Construction Engineering and Management, 132*(2), 181-188.

Thomas, S. R., Macken, C. L., Chung, T. H., & Kim, I. (2002). *Measuring the Impacts of the Delivery System on Project Performance: Design-Build and Design-Bid-Build*: National Institute of Standards and Technology.

Trauner, T. J. (2009). *Construction Delays, Understanding Them Clearly, Analyzing Them Correctly* (2nd ed.): Elsevier Inc.

TXDOT. (2009). Guide to Contractor Overhead. *Constrcution amd Material Tips*. Retrieved from ftp://ftp.dot.state.tx.us/pub/txdot-info/cst/tips/overhead_guidance.pdf

Tyler, S. M. (1994). No (Easy) Way out: "Liquidating" Stipulated Damages for Contractor Delay in Public Construction Contracts. *Duke Law Journal, 44*(2), 357-435.

USACE. (1979). *US Army Corps of Engineers - Modification Impact Evaluation Guide* (Vol. EP 415-1-3). Washingtion, D.C: Department of the Army.

USACE. (1991). Severe Weather Impact Analysis. Washington D.C.: US Army Corps of Engineers Construction Engineering Research Laboratory.

USACE. (2008). U.S Army Corps of Engineers - Construction Cost Estimating Guide for Civil Works. In J. C. Dalton (Eds.)

Walewski, J., G. E.Gibson, J., & Jasper, J. (2001). *Project Delivery Methods and contracting Approaches available for implementation by Texas Department of Transportation*. Austin, TX: Texas Department of Transportation.

Wall, K. (2008). Progress with the national infrastructure maintenance strategy. the 27th Annual Southern African Transport Conference 7 - 11 July 2008 "Partnership for research and progress in transportation. CSIR International Convention Centre, Pretoria, South Africa

Washington, S. (2011). *Statistical and econometric methods for transportation data analysis*. Boca Raton, FL: CRC Press.

W.D. Mo. (1984). Havens Steel Co. v. Randolph Engineering Co., 613 F. Supp. 514 - Dist. Court, WD Missouri 1985.

Wickwire, J. M., Driscoll, T. J., Hurlbut, S. B., & Hillman, S. B. (2003). *Construction Scheduling: Preparation, Liability, and Claims* (Second ed.): Aspen Publishers, Inc.

Winter, J. (2001). Head office and overhead. Retrieved from <www.bakernet.com/NR/rdonlyres/.../28901/HeadOfficeOverheadandProfit2.pdf>

Wray, R. W. (2008). Constructive Acceleration. Retrieved October 20, 2012, from http://corporate.findlaw.com/litigation-disputes/constructive-acceleration.html

Wright, E. L. (1991). *Elements of an Acceleration Claim*. Paper presented at the Southern Surety & Fidelity Claims Conference.

Wright, T. P. (1936). Factors Affecting the Cost of Airplanes. *Journal of Aeronautical Sciences, 3*(4), 122-128.

Wylie, J., & Fahy, C. (2007). Proving and Defending Lost-Profits Claims. *Business Torts Journal, ABA SECTION OF LITIGATION*.

Yakowenko, G. (2004). Megaproject Procurement: Breaking from Tradition. *FHWA Publications, Public Roads, 68*.

Yakowenko, J. (2010). FHWA's EDC Project Delivery Initiatives.

Yogeswaran, K., Kumaraswamy, M. M., & Miller, D. R. A. (1998). Claims for extensions of time in civil engineering projects. *Construction Management and Economics, 16*(3), 283-293.

Zack, J. G. (2001). Calculation and Recovery of Home Office Overhead. *CM eJOURNAL*.

Zack Jr, J. G. (2001a). But-For Schedules--Analysis and Defense. [Article]. Cost Engineering, 43(8), 13.

Zack, J. G. (2006). *Delay and Delay Analysis: Isn't it Simple ?* Paper presented at the 1st ICEC & IPMA Global Congress on Project Management, Ljubljana, Slovenia.

Zack Jr, J. G. (2000). Pacing Delays--The Practical Effect. [Article]. *Cost Engineering*, *42*(7), 23.

APPENDIX A – CLAIMS LIST

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
1	1999	10575	Wildcat Creek to Roosa - Mostly Conc. Pavement	5	Road/ creek	Mostly Conc.
2	1999	10575	West of Durango - Mostly Conc. Pavement	5	Road/ creek	Mostly Conc.
3	2000	10592	El Moro Rest Area	2	Rest Area	Other
4	4 /2 /2002	10592	El Moro Rest Area	2	Rest Area	Other
5	10/2 /2001	10592	El Moro Rest Area	3	Rest Area	Other
6	6 /24/2002	11582	Salt Creek	2	Road/ creek	Mostly Conc.
7	6 /24/2002	11582	Salt Creek	2	Road/ creek	Mostly Conc.
8	6 /24/2002	11582	Salt Creek	2	Road/ creek	Mostly Conc.
9	6 /25/2002	11582	Salt Creek	2	Road/ creek	Mostly Conc.
10	6 /25/2002	11582	Salt Creek	2	Road/ creek	Mostly Conc.
11	6 /25/2002	11582	Salt Creek	2	Road/ creek	Mostly Conc.
12	6 /25/2002	11582	Salt Creek	2	Road/ creek	Mostly Conc.
13	6 /25/2002	11582	Salt Creek	2	Road/ creek	Mostly Conc.
14	6 /27/2002	11582	Salt Creek	2	Road/ creek	Mostly Conc.
15	6 /27/2002	11582	Salt Creek	2	Road/ creek	Mostly Conc.
16	4 /22/2002	11846	Eagle Cliff to Settlers Dr	1	Road	Mostly Conc.
17	2002	11925	SH7 to WCR 16	4	Road	Mostly Conc.
18	2002	11925	SH7 to WCR 16	4	Road	Mostly Conc.
19	2002	11925	SH7 to WCR 16	4	Road	Mostly Conc.
20	5 /30/2001	11942	I-25 Climbing Lane	1	Road	Conc.
21	6 /8 /2001	11951	I25/US 36 HOV Ph IV	6	Road	Mostly Conc.

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
22	8 /23/2002	11955	Big Turkey Ck - N. & S.	2	HMA road/Creek	Other
23	8 /23/2002	11955	Big Turkey Ck - N. & S.	2	HMA road/Creek	Other
24	8 /23/2002	11955	Big Turkey Ck - N. & S.	2	HMA road/Creek	Other
25	8 /28/2002	11955	Big Turkey Ck - N. & S.	2	HMA road/Creek	Other
26	11/22/2002	11964	I25/Woodmen Road Interchange - Col. Spr.	2	Road Interchange	Mostly Conc.
27	7 /15/2005	11964	I25/Woodmen Road Interchange - Col. Spr.	2	Road Interchange	Mostly Conc.
28	9 /5 /2001	12018	Haymaker Golf Course	3	Other	Other
29	9 /27/2001	12056	I-76/120th Ave/Phase 2	6	Road	Conc.
30	9 /11/2003	12056	I-76 /120th Ave/Phase 2	6	Road	Conc.
31	4 /1 /2002	12190	Roadway SH 66 to L. Thompson	4	Road	Conc.
32	2 /15/2001	12271	SH 82, ABC to Buttermilk	3	Road- bus lane	HMA
33	2002-2003	12278	W. of Muddy Pass	3	Road	HMA
34	2002-2003	12278	W. of Muddy Pass	3	Road	HMA
35	8 /6 /2003	12278	W. of Muddy Pass	3	Road	HMA
36	8 /20/2003	12278	W. of Muddy Pass	3	Road	HMA
37	2001	12317	Wiley Jct.-East	2	Road Junction	Conc.
38	10/21/2002	12317	Wiley Jct.-East	2	Road Junction	Conc.
39	1 /24/2008	12418	Berthoud Fall West 2 miles	1	Road-Heli	HMA
40	1999-2007	12501	Group D, SH 50 Improvements	2	Road	HMA

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
41	2002-2003	12548	SH 50 19th Street to Raynolds ave.	2	Road	HMA
42	7 /1 /2003	12548	SH 50 19th Street to Raynolds ave.	2	Road	HMA
43	2 /6 /2001	12567	SH74 Left Turn Lane-Kittredge	1	Road- turn Lane	HMA
44	7/1/2008	12623	Major Widening- Conc. Road (I-25 Reconstruction)	4	Road - Major widening	Conc.
45	7/1/2008	12623	Major Widening- Conc. Road (I-25 Reconstruction)	4	Road - Major widening	Conc.
46	7/1/2008	12623	Major Widening- Conc. Road (I-25 Reconstruction)	4	Road - Major widening	Conc.
47	7/1/2008	12623	Major Widening- Conc. Road (I-25 Reconstruction)	4	Road - Major widening	Conc.
48	7/1/2008	12623	Major Widening- Conc. Road (I-25 Reconstruction)	4	Road - Major widening	Conc.
49	7/1/2008	12623	Major Widening- Conc. Road (I-25 Reconstruction)	4	Road - Major widening	Conc.
50	7/1/2008	12623	Major Widening- Conc. Road (I-25 Reconstruction)	4	Road - Major widening	Conc.
51	7/1/2008	12623	Major Widening- Conc. Road (I-25 Reconstruction)	4	Road - Major widening	Conc.
52	6/22/1905	12631	SH 50B & SH 50c- avondale	4	Signage	Other
53	2001-2003	12638	SH 270 Extension Phase IV	6	Road-Bridge (Rehab.)	Conc.
54	2001-2003	12638	SH 270 Extension Phase IV	6	Road-Bridge (Rehab.)	Conc.
55	9 /3 /2004	12638	SH 270 Extension Phase IV	6	Road-Bridge (Rehab.)	Conc.
56	6 /19/2001	12685	US Highway 50 West of Granda	2	Road	HMA
57	1 /2 /2002	12685	US Highway 50 West of Granda	2	Road	HMA
58	4 /4 /2001	12694	Yellow Jacket Rockfall mitigation	5	Rock Mitigation	Other

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
59	5 /29/2001	12713	Wolf Creek-Upper Narrows	5	Road/Tunnel widening and rehab)	HMA/shotcrete
60	3 /30/2004	12982	South Bore Tunnel Lighting	1	Tunnel Lighting	Other
61	12/23/2002	13131	US 24 - Divide East	2	Raod	HMA
62	10/24/2008	13141	Bridge Replacement - 4th St. Bridge	2	Bridge Replacement	Conc.
63	11/21/2008	13141	Bridge Replacement - 4th St. Bridge	2	Bridge Replacement	Conc.
64	12/3/2008	13141	Bridge Replacement - 4th St. Bridge	2	Bridge Replacement	Conc.
65	2004-2006	13216	Park Avenue in Breckenridge	1	Road	HMA
66	10/9 /2002	13227	US 285 - Jct SH 17-N, phase 1	5	Road Junction	Conc.
67	10/14/2002	13229	Eagle-Vail 1/2 Diamond	3	Road-Bridge (Improvements)	HMA - Conc.
68	3 /19/2002	13255	Fairplay N & S (II)	1	Road	HMA
69	2003	13278	SH287-Colfax to I70	6	Road	HMA-Conc.
70	2003-2004	13278	SH287-Colfax to I70	6	Road	HMA-Conc.
71	7 /2 /2003	13278	SH287-Colfax to I70	6	Road	HMA-Conc.
72	3 /27/2006	13393	S/O LCR6 to S/O SH60 (Berthoud By Pass)	4	This 5.25-mile project realigns U.S. 287 to bypass the town of Berthoud, with the new roadway consisting of four lanes, turn lanes and acceleration/deceleration lanes. Four bridges and three sound walls will be constructed and intersection improvements will be made. Concrete paving and work on the old U.S. 287 is still under way	Conc.

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
73	3 /28/2007	13393	S/O LCR6 to S/O SH60 (Berthoud By Pass)	4	This 5.25-mile project realigns U.S. 287 to bypass the town of Berthoud, with the new roadway consisting of four lanes, turn lanes and acceleration/deceleration lanes. Four bridges and three sound walls will be constructed and intersection improvements will be made. Concrete paving and work on the old U.S. 287 is still under way	Conc.
74	10/13/2004	13398	SH 83 @ Castlewood Canyon	1	Bridge Reconstruction	HMA/Conc.
75	9 /30/2002	13434	SH 40 Berthoud Falls-Empire	1	Road Rehab.	HMA
76	2002-2003	13435	SH 6 and SH 9 Dillon/silverstone	1	Road	HMA
77	2002	13439	Jct US 50/I25 to Troy	2	Road Junction	HMA
78	2002	13439	Jct US 50/I25 to Troy	2	Road Junction	HMA
79	2001-2002	13448	Stonewall to Weston	2	Road	HMA
80	12/6 /2007	13472	Cimmarron-West	3	Road Rehab.	HMA
81	10/2 /2002	13479	SH 115, Roca Roja and Calle Del Fuente Intersections	2	Road Intersections	HMA-Conc.
82	10/4 /2002	13479	SH 115, Roca Roja and Calle Del Fuente Intersections	2	Road Intersections	HMA-Conc.
83	10/4 /2002	13479	SH 115, Roca Roja and Calle Del Fuente Intersections	2	Road Intersections	HMA-Conc.
84	10/4 /2002	13479	SH 115, Roca Roja and Calle Del Fuente Intersections	2	Road Intersections	HMA-Conc.
85	11/26/2002	13479	SH 115, Roca Roja and Calle Del Fuente Intersections	2	Road Intersections	HMA-Conc.
86	7 /14/2003	13479	SH 115, Roca Roja and Calle Del Fuente Intersections	2	Road Intersections	HMA-Conc.

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
87	7 /14/2003	13479	SH 115, Roca Roja and Calle Del Fuente Intersections	2	Road Intersections	HMA-Conc.
88	7 /29/2003	13479	SH 115, Roca Roja and Calle Del Fuente Intersections	2	Road Intersections	HMA-Conc.
89	7 /29/2003	13479	SH 115, Roca Roja and Calle Del Fuente Intersections	2	Road Intersections	HMA-Conc.
90	7 /30/2003	13479	SH 115, Roca Roja and Calle Del Fuente Intersections	2	Road Intersections	HMA-Conc.
91	7 /30/2003	13479	SH 115, Roca Roja and Calle Del Fuente Intersections	2	Road Intersections	HMA-Conc.
92	7 /30/2003	13479	SH 115, Roca Roja and Calle Del Fuente Intersections	2	Road Intersections	HMA-Conc.
93	5 /23/2005	13500	I-270 Extension Ph. V	6	Road resurfacing & Bridge project includes construction of a 1,400-ft-long flyover from southbound I-25 to eastbound I-270. It also resurfaces southbound I-25 in concrete from 84th Avenue to the I-76 ramp and constructs a masonry sound wall on the west side of I-25 between U.S. 36 and 84th Avenue. Construction of the flyover is under way and expected to open in June 2005. This is the fifth phase of six-phase project.	Conc.
94	2003	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
95	2003	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
96	2003	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
97	2003	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
98	2003	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
99	2003	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
100	2003	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
101	11/24/2003	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
102	11/24/2003	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
103	11/24/2003	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
104	11/24/2003	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
105	11/24/2003	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
106	12/10/2004	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
107	12/10/2004	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
108	5 /19/2005	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
109	5 /19/2005	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
110	5 /19/2005	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
111	5 /19/2005	13501	Wolf Crk Pass Tunnel Lining and Roadway	5	Tunnel Lining & Roadway + improvement (electrical and controls)	Conc.
112	2002-2004	13529	Ken Pratt Blvd. - US 287-SH119 Ph 2	4	Raod Intersection Improvement	Conc.

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
113	7 /26/2004	13535	Fruita to Clifton	3	Road Maint. (Levelling courses & Recycling)	HMA
114	3 /21/2007	13697	Parker Rd & Quincy Intersection	6	Road Intersection	Conc.
115	2001-2002	13736	R6 Bridge Deck Repair	6	Bridge - Deck Repair	Conc.
116	3 /30/2004	13756	I-70 Vail Pass Girder Repair & Bridge Expansion Joints	1	Bridge - Rehab.	Other
117	Yr. 2008	13808	US 34 BUS.:SH 257-71ST AVE.	4	Road	Conc.
118	Yr. 2008	13808	US 34 BUS.:SH 257-71ST AVE.	4	Road	Conc.
119	2002-2003	13831	I-76 & 88th Ave	6	Road Interchange Reconstruction	Conc.
120	2003	13869	Monarch TER	5	Trcuk Escape Ramp	HMA/Other
121	9 /20/2004	13869	Monarch TER	5	Trcuk Escape Ramp	HMA/Other
122	10/17/2002	13880	S. Fork to Creede	5	Road - Resurface may be	HMA
123	12/15/2005	13898	US 85 Highlands Ranch to Titan	1	Road	Conc.
124	3 /27/2006	13920	SH67/US24 Intersection E & W	2	Road Intersection	HMA
125	3 /27/2006	13920	SH67/US24 Intersection E & W	2	Road Intersection	HMA
126	3 /27/2006	13920	SH67/US24 Intersection E & W	2	Road Intersection	HMA
127	3 /27/2006	13920	SH67/US24 Intersection E & W	2	Road Intersection	HMA
128	3 /27/2006	13920	SH67/US24 Intersection E & W	2	Road Intersection	HMA
129	3 /27/2006	13920	SH67/US24 Intersection E & W	2	Road Intersection	HMA
130	3 /27/2006	13920	SH67/US24 Intersection E & W	2	Road Intersection	HMA
131	Yr.2005	13923	LOS PINOS River In IGNACIO	5	Bridge - Replacement (The 250-ft steel-truss bridge, constructed in the 1930s, was replaced with a concrete box girder structure with sidewalks in both directions)	Conc.
132	2003-2004	13941	US 550 Rockfall Mitigation at MP 68.5	5	Rock Mitigation - Roadway Improvements	Other

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
133	2003-2005	13965	Almont	3	Road	HMA
134	4 /26/2006	13969	Lonesome Dove to Windy Point	5	Road - Roadway realignment, new turn lanes,	HMA
135	Yr. 2003	14014	Deck Rehab of Str F-14-Y	1	Bridge - Deck Rehab	Other
136	Yr. 2004	14164	Red Cliff Arch	3	Bridge - Deck replacement & widening + Steel Repaint	Other
137	Yr. 2003	14199	SH 12 East of Segundo	2	Road	HMA
138	2 /4 /2004	14206	Lathrop to Walsenburg	2	Road - Resurface may be	HMA
139	4 /4 /2006	14234	I-270, Vasquez to I-70	6	Road	Conc.
140	12/7 /2007	14315	24 Road Interchange	3	Road Interchange	HMA
141	9 /20/2004	14350	2-Sites Pine Creek & Noisewall	2	Other - Noise Walls	Other
142	Yr. 2003	14353	US 285 Parkview-Kenosha Pass	1	Safety Improvements	HMA/Other
143	1 /3 /2007	14416	Int. Imp. at SH 121 and SH 128	6	Road Interchange	Conc.
144	12/22/2008	14557	US 160 Main & 6th St Intersection Alamosa	5	Road - Capacity improvement (This capacity-improvement project involved concrete reconstruction of Sixth Street through Alamosa, which has become the new U.S. 160 two-lane eastbound alignment, and restriping and installation of new signals on U.S. 160/Main Street, which has become a new three-lane westbound alignment. Construction was set for completion in July 2008, following a winter suspension, but crews completed the project six months ahead of schedule.)	Conc.
145	5 /1 /2006	14613	I-25 Overlay 120th to SH7	6	Road - Overaly	HMA
146	5 /1 /2006	14613	I-25 Overlay 120th to SH7	6	Road - Overaly	HMA

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
147	5 /1 /2006	14613	I-25 Overlay 120th to SH7	6	Road - Overaly	HMA
148	7 /8 /2005	14657	SH 83 & SH 86 Resurfacing & Climbing Ln	1	Road - Resurface and climbing lane	HMA
149	7 /8 /2005	14657	SH 83 & SH 86 Resurfacing & Climbing Ln	1	Road - Resurface and climbing lane	HMA
150	Yr. 2005	14661	SH 96A Acero to Orman	2	Road - Rehab & other	HMA
151	4 /28/2008	14777	Speer/I-25 Interchange Reconstruction	6	Road - Interchange Construction	HMA-Conc.
152	6 /22/2010	14959	SH 58 over 44th Avenue Bridge Replacement	6	Bridge - Replacement	Other
153	Yr. 2009	14976	Reconstruction - US-85 Titan to Cook Ranch Conc. Road	1	Road - Reconstruction	Conc. - HMA
154	Yr. 2009	14976	Reconstruction - US-85 Titan to Cook Ranch Conc. Road	1	Road - Reconstruction	Conc. - HMA
155	Yr. 2009	14976	Reconstruction - US-85 Titan to Cook Ranch Conc. Road	1	Road - Reconstruction	Conc. - HMA
156	Yr. 2005	14978	US 160 Slides west of Durango	5	Landslide repairs	Other
157	9 /26/2006	15030	East & West Parshall - SH 40	3	Road - Resurface may be	HMA
158	1 /25/2006	15039	Trinidad South Overlay	2	Road - Overlay	HMA
159	Yr. 2009	15049	US 285 at Deer Creek	1	Interchange -construction of two bridges, on- and off-ramps, new retaining walls, a new storm sewer system, extensive earthwork and rock excavation, and paving that allows County Roads 43 and 72 to run underneath U.S. Highway 285.	HMA - Other
160	1 /30/2006	15070	Intrsec Impr SH 340 & 20 3/4 Rd	3	Road - Intersection Improvement	HMA
161	9 /25/2006	15075	Cortez/Durango Conc. Joint Seal	5	Road - Maintenance	Conc. Joint seal

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
162	4 /1 /2006	15162	McClave Jct E&W	2	Road - (adding lanes) asphalt paving, construction of acceleration and deceleration lanes	HMA
163	4 /1 /2006	15162	McClave Jct E&W	2	Road - (adding lanes) asphalt paving, construction of acceleration and deceleration lanes	HMA
164	Yr. 2009	15176	Reconstruction - Alamosa North- HMA	5	Road - Reconstruction	HMA
165	Yr. 2009	15176	Reconstruction - Alamosa North- HMA	5	Road - Reconstruction	HMA
166	6 /13/2007	15364	6th Ave: 19th St to Colfax	6	Road	HMA
167	12/11/2007	15364	6th Ave: 19th St to Colfax	6	Road	HMA
168	Yr. 2010	15491	Mineral Creek Bridge	5	Bridge - Replacement replaced with a single-span steel girder structure with wider shoulders	other - HMA
169	Yr.2010	15555	Reconstruction - I-25, Douglas Lane to 5th Street	1	Road - lanes addition (widens northbound and southbound I-25 from two to three lanes between 5th Street and Douglas Lane and reconstructs the I-25/Plum Creek Parkway Interchange, 300 to 400 ft north of the current half-interchange, with new ramps, bridges, lighting and landscaping. Plum Creek Parkway also is being widened and straightened west of Wilcox Street)	Conc.
170	Yr.2010	15564	I-70 joint Repairs Phase 2	6	Bridge Restor/Rehab -	Other
171	Yr.2010	15564	I-70 joint Repairs Phase 2	6	Bridge Restor/Rehab -	Other
172	Yr.2010-2011	15564	I-70 joint Repairs Phase 2	6	Bridge Restor/Rehab -	Other
173	Yr. 2005	15566	I-70 Viaduct Temp shoring	6	Other	other

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
174	2008	15666	NM State Line N -Phase II	5	Road - Lanes addition (Widens just over two miles of U.S. 550 from two to four lanes, including drainage and wildlife mitigation)	HMA
175	3 /25/2009	15676	Granite Culvert Repair	5	Culvert Repairs	Other
176	2008-2009	15821	Colfax, 6th Ave to I-70	6	Road - Resurface may be	HMA
177	2008	15903	I-70 Wildlife Fence West of Vail	3	Fence	Other
178	2009	15915	Powers/SH16 Initial Connect	2	Road - interchange (interchange improvements on SH 16 in El Paso County)	Conc.
179	2009	15915	Powers/SH16 Initial Connect	2	Road - interchange (interchange improvements on SH 16 in El Paso County)	Conc.
180	2009	15915	Powers/SH16 Initial Connect	2	Road - interchange (interchange improvements on SH 16 in El Paso County)	Conc.
181	2009-2010	16025	I-25 Frontage Road & 8 Laning	1	Road - widening by adding lanes and a new frontrange road 2.6 miles long	Conc.
182	2009-2010	16025	I-25 Frontage Road & 8 Laning	1	Road - widening by adding lanes and a new frontrange road 2.6 miles long	Conc.
183	11/8 /2007	16028	SH 83, El Paso County Line North	1	Road - Resurfacing may be	HMA
184	10/8 /2008	16028	SH 83, El Paso County Line North	1	Road - Resurfacing may be	HMA

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
185	2009-2010	16042	US 160 4th Lane	5	Road - Lane addition (construction of a second westbound lane, and also includes partial construction of a new interchange with US 550, four new bridges and ramps east of the current intersection.)	HMA
186	2009-2010	16042	US 160 4th Lane	5	Road - Lane addition (construction of a second westbound lane, and also includes partial construction of a new interchange with US 550, four new bridges and ramps east of the current intersection.)	HMA
187	2009	16214	SH 66 - US 36 to SH 287	4	Road - overlay	Conc.
188	2009	16214	SH 66 - US 36 to SH 287	4	Road - overlay	Conc.
189	2009	16214	SH 66 - US 36 to SH 287	4	Road - overlay	Conc.
190	2008	16446	SH 135 Crested Butte South	3	Road - overlay (2" Hot Mix Asphalt (HMA) overlay on approximately 8 miles of State Highway 135 near Crested Butte, Colorado.)	HMA
191	2008	16446	SH 135 Crested Butte South	3	Road - overlay (2" Hot Mix Asphalt (HMA) overlay on approximately 8 miles of State Highway 135 near Crested Butte, Colorado.)	HMA
192	2009	16493	US 40 Downtown Steamboat	3	Road - Reconstruction (other improvements too)	Conc.

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
193	2010	16657	New Construction - Parker Rd.- Arapahoe Interchange Phase IV	6	Road - interchange (construct a grade-separated interchange that carries Parker Road over Arapahoe Road. The corresponding ramps will also be constructed to complete the full interchange.)	Conc.
194	2010	17168	SH2: Alameda to MLK Resurfacing	6	Road - Resurfacing (surface treatment)	HMA
195	2011	17537	Bridge Replacement I70 over Sand Creek	6	Bridge - Replacment	Other - HMA
196	2010	17604	Improvements at Powers and Dublin	2	Safety Improvements	Other
197	2010-2011	17734	SH 177- University Blvd at C-470	6	Road - Surface treatment (Conc. Pave & slab repair)	Conc.
198	2011	18115	NB I-25 at Missouri Creek	2	Bridge	other
199	6 /25/2002	91033	Del Camino Interchange	4	Road - Interchange	Conc.
200	11/1 /2001	92999	15.2 and 23.3 Mi E of SH 350 (Str P-20-E)	2	Road - Bridge	HMA - Conc.
201	2000-2007	93222	270 Extension Phase II and III	6	Road - Bridges (seven structures at the I-270 and I-76 interchange, rebuilt ramp movements from westbound I-270 to eastbound and westbound I-76)	Conc.
202	2000-2007	93222	270 Extension Phase II and III	6	Road - Bridges (seven structures at the I-270 and I-76 interchange, rebuilt ramp movements from westbound I-270 to eastbound and westbound I-76)	Conc.
203	2000-2007	93222	270 Extension Phase II and III	6	Road - Bridges (seven structures at the I-270 and I-76 interchange, rebuilt ramp movements from westbound I-270 to eastbound and westbound I-76)	Conc.

No.	DATE OF REPORT	PCN	NAME	REG	Scope of wk.	Material
204	10/3 /2007	93222	270 Extension Phase II and III	6	Road - Bridges (seven structures at the I-270 and I-76 interchange, rebuilt ramp movements from westbound I-270 to eastbound and westbound I-76)	Conc.
205		M1030	I-70 Seibert	1		
206		M4024	R4 - FY 03 Concrete Slab Replacement	4		
207	4 /18/2001	12355	Interstate Safety-Guardrail	6		
208	1 /14/2004	M5030	Region 5 Sign	5		
209	7 /22/2004	M5028	Region 5 Sign	5		
210	10/17/2005	M5039	R5 Sign Replacement	5		
211	7 /26/2006	M5047	Replace 2 Signals MV	5		
212	Yr. (2008-2012)	15577	US-285 Design Build Reconstruction	6		
213		16728	WIM Various Locations	HQ		

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
1	fixed date	1991	1997	$7,603,400	$8,624,924	11.8%	837
2	fixed date	1991	1997	$7,603,400	$8,624,924	11.8%	837
3	schd. dys	1991	1999	$3,899,861	$4,298,520	9.3%	128
4	schd. dys	1991	1999	$3,899,861	$4,298,520	9.3%	128
5	schd. dys	1991	1999	$3,899,861	$4,298,520	9.3%	128
6	schd. dys	1999	2000	$8,987,667	$9,610,636.77	6.5%	430
7	schd. dys	1999	2000	$8,987,667	$9,610,636.77	6.5%	430
8	schd. dys	1999	2000	$8,987,667	$9,610,636.77	6.5%	430
9	schd. dys	1999	2000	$8,987,667	$9,610,636.77	6.5%	430
10	schd. dys	1999	2000	$8,987,667	$9,610,636.77	6.5%	430
11	schd. dys	1999	2000	$8,987,667	$9,610,636.77	6.5%	430
12	schd. dys	1999	2000	$8,987,667	$9,610,636.77	6.5%	430
13	schd. dys	1999	2000	$8,987,667	$9,610,636.77	6.5%	430
14	schd. dys	1999	2000	$8,987,667	$9,610,636.77	6.5%	430
15	schd. dys	1999	2000	$8,987,667	$9,610,636.77	6.5%	430
16	schd. dys	1991	1998	$19,295,000	$22,286,630.86	13.4%	360
17	schd. dys	1999	2001	$53,544,870	$61,609,799	13.1%	680
18	schd. dys	1999	2001	$53,544,870	$61,609,799	13.1%	680
19	schd. dys	1999	2001	$53,544,870	$61,609,799	13.1%	680
20	schd. dys	1994	1998	$20,381,547	$21,361,925	4.6%	265
21	schd. dys	1994	1998	$17,804,598	$21,254,489.48	16.2%	700

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
22	fixed date	1999	2001	$5,990,060	$6,323,280	5.3%	445
23	fixed date	1999	2001	$5,990,060	$6,323,280	5.3%	445
24	fixed date	1999	2001	$5,990,060	$6,323,280	5.3%	445
25	fixed date	1999	2001	$5,990,060	$6,323,280	5.3%	445
26	schd. dys	1998	2000	$28,950,000	$30,194,100	4.1%	705
27	schd. dys	1998	2000	$28,950,000	$30,194,100	4.1%	705
28	schd. dys	1998	2000	$4,186,165	$5,288,473	20.8%	130
29	schd. dys	1998	2000	$19,237,803	$20,482,320	6.1%	820
30	schd. dys	1998	2000	$19,237,803	$20,482,320	6.1%	820
31	schd. dys	1994	1999	$10,540,925	$13,347,727	21.0%	260
32	fixed date	1999	2000	$11,366,680	$13,695,864	17.0%	577
33	schd. dys	1998	2002	$3,988,412	$4,925,478	19.0%	160
34	schd. dys	1998	2002	$3,988,412	$4,925,478	19.0%	160
35	schd. dys	1998	2002	$3,988,412	$4,925,478	19.0%	160
36	schd. dys	1998	2002	$3,988,412	$4,925,478	19.0%	160
37	fixed date	1998	2000	$10,791,141	$13,809,290	21.9%	523
38	fixed date	1998	2000	$10,791,141	$13,809,290	21.9%	523
39	schd. dys	2002	2004	$15,581,590	$16,189,104	3.8%	250
40	schd. dys	1994	1999	$9,611,169	$11,220,198	14.3%	425

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
41	schd. dys	1999	2002	$1,961,602	$2,129,046	7.9%	80
42	schd. dys	1999	2002	$1,961,602	$2,129,046	7.9%	80
43	schd. dys	1999	2000	$414,737	$393,421	-5.4%	35
44	schd. dys	2005	2006	$35,949,933	$39,711,844	9.5%	395
45	schd. dys	2005	2006	$35,949,933	$39,711,844	9.5%	395
46	schd. dys	2005	2006	$35,949,933	$39,711,844	9.5%	395
47	schd. dys	2005	2006	$35,949,933	$39,711,844	9.5%	395
48	schd. dys	2005	2006	$35,949,933	$39,711,844	9.5%	395
49	schd. dys	2005	2006	$35,949,933	$39,711,844	9.5%	395
50	schd. dys	2005	2006	$35,949,933	$39,711,844	9.5%	395
51	schd. dys	2005	2006	$35,949,933	$39,711,844	9.5%	395
52	schd. dys	1991	1999	$58,161	$52,114	-11.6%	10
53	schd. dys	1999	2001	$8,495,151	$9,284,506	8.5%	500
54	schd. dys	1999	2001	$8,495,151	$9,284,506	8.5%	500
55	schd. dys	1999	2001	$8,495,151	$9,284,506	8.5%	500
56	schd. dys	1999	2000	$2,397,947	$2,465,712	2.7%	90
57	schd. dys	1999	2000	$2,397,947	$2,465,712	2.7%	90
58	schd. dys	1999	2000	$474,398	$641,716	26.1%	35

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
59	fixed date	1999	2000	$10,346,811	$13,555,142	23.7%	626
60	schd. dys	1999	2000	$7,479,437	$10,188,931	26.6%	240
61	schd. dys	1999	2001	$5,315,496	$5,323,316	0.1%	240
62	schd. dys	2005	2007	$27,657,855	$32,068,284	13.8%	1278
63	schd. dys	2005	2007	$27,657,855	$32,068,284	13.8%	1278
64	schd. dys	2005	2007	$27,657,855	$32,068,284	13.8%	1278
65	schd. dys	2002	2004	$5,191,230	$5,559,512	6.6%	170
66	fixed date	1999	2001	$2,974,256	$3,094,888	3.9%	394
67	fixed date	1999	2002	$4,682,920	$4,808,525	2.6%	497
68	schd. dys	1999	2000	$1,127,000	$1,138,871	1.0%	35
69	schd. dys	1999	2002	$2,648,202	$2,531,625	-4.6%	180
70	schd. dys	1999	2002	$2,648,202	$2,531,625	-4.6%	180
71	schd. dys	1999	2002	$2,648,202	$2,531,625	-4.6%	180
72	schd. dys	2002	2002	$26,485,660	$29,766,009	11.0%	750

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
73	schd. dys	2002	2002	$26,485,660	$29,766,009	11.0%	750
74	schd. dys	2002	2003	$3,238,426	$3,720,205	13.0%	112
75	schd. dys	1999	2002	$1,999,952	$1,819,873	-9.9%	80
76	fixed date	1999	2002	$2,324,395	$2,640,522	12.0%	160
77	schd. dys	1999	2002	$2,299,964	$2,442,917	5.9%	120
78	schd. dys	1999	2002	$2,299,964	$2,442,917	5.9%	120
79	schd. dys	1999	2002	$1,329,116	$1,337,158	0.6%	45
80	schd. dys	2002	2004	$3,840,372	$3,925,128	2.2%	120
81	fixed date	1999	2002	$1,856,026	$1,856,026	0.0%	611
82	fixed date	1999	2002	$1,856,026	$1,856,026	0.0%	611
83	fixed date	1999	2002	$1,856,026	$1,856,026	0.0%	611
84	fixed date	1999	2002	$1,856,026	$1,856,026	0.0%	611
85	fixed date	1999	2002	$1,856,026	$1,856,026	0.0%	611
86	fixed date	1999	2002	$1,856,026	$1,856,026	0.0%	611

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
87	fixed date	1999	2002	$1,856,026	$1,856,026	0.0%	611
88	fixed date	1999	2002	$1,856,026	$1,856,026	0.0%	611
89	fixed date	1999	2002	$1,856,026	$1,856,026	0.0%	611
90	fixed date	1999	2002	$1,856,026	$1,856,026	0.0%	611
91	fixed date	1999	2002	$1,856,026	$1,856,026	0.0%	611
92	fixed date	1999	2002	$1,856,026	$1,856,026	0.0%	611
93	schd. dys	2002	2003	$15,807,428	$16,782,045	5.8%	480
94	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
95	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
96	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
97	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
98	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
99	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
100	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
101	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
102	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
103	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
104	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
105	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
106	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
107	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
108	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
109	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
110	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
111	fixed date	2002	2002	$12,234,814	$12,274,727	0.3%	451
112	schd. dys	2002	2002	$11,133,683	$10,991,321	-1.3%	280

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
113	fixed date	1999	2004	$7,817,861	$7,666,348	-2.0%	199
114	schd. dys	2002	2005	$3,475,009	$3,692,332	5.9%	120
115	schd. dys	1999	2001	$1,019,991	$776,429	-31.4%	130
116	schd. dys	1999	2002	$740,205	$1,036,264	28.6%	60
117	schd. dys	2005	2008	$12,764,337	$14,849,499	14.0%	260
118	schd. dys	2005	2008	$12,764,337	$14,849,499	14.0%	260
119	schd. dys	2002	2002	$4,803,223	$6,760,292	28.9%	225
120	schd. dys	2002	2003	$1,466,129	$1,590,449	7.8%	90
121	schd. dys	2002	2003	$1,466,129	$1,590,449	7.8%	90
122	schd. dys	1999	2002	$3,361,735	$3,499,259	3.9%	65
123	schd. dys	2002	2004	$9,822,222	$9,375,824	-4.8%	180
124	schd. dys	1999	2002	$4,777,176	$6,528,952	26.8%	190
125	schd. dys	1999	2002	$4,777,176	$6,528,952	26.8%	190
126	schd. dys	1999	2002	$4,777,176	$6,528,952	26.8%	190
127	schd. dys	1999	2002	$4,777,176	$6,528,952	26.8%	190
128	schd. dys	1999	2002	$4,777,176	$6,528,952	26.8%	190
129	schd. dys	1999	2002	$4,777,176	$6,528,952	26.8%	190
130	schd. dys	1999	2002	$4,777,176	$6,528,952	26.8%	190
131	fixed date	2002	2005	$3,170,920	$3,120,776	-1.6%	180
132	schd. dys	2002	2003	$1,227,062	$1,666,300	26.4%	75

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
133	schd. dys	2002	2003	$6,157,809	$7,048,015	12.6%	200
134	schd. dys	2002	2003	$14,496,678	$15,349,793	5.6%	550
135	schd. dys	2002	2003	$478,229	$399,446	-19.7%	70
136	fixed date	2002	2003	$3,593,871	$3,632,618	1.1%	244
137	schd. dys	2002	2003	$953,785	$1,348,858	29.3%	35
138	schd. dys	2002	2003	$537,085	$483,659	-11.0%	40
139	schd. dys	2002	2005	$6,106,039	$6,450,242	5.3%	169
140	schd. dys	2002	2005	$5,774,004	$5,960,280	3.1%	170
141	schd. dys	1998	2003	$1,493,933	$1,718,174	13.1%	105
142	schd. dys	2002	2003	$737,038	$711,022	-3.7%	50
143	schd. dys	2005	2006	$3,921,893	$3,963,572	1.1%	363
144	schd. dys	2005	2007	$8,008,940	$9,826,919	18.5%	280
145	schd. dys	2002	2004	$4,034,586	$4,428,442	8.9%	165
146	schd. dys	2002	2004	$4,034,586	$4,428,442	8.9%	165

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
147	schd. dys	2002	2004	$4,034,586	$4,428,442	8.9%	165
148	schd. dys	2002	2004	$5,191,685	$5,356,361	3.1%	169
149	schd. dys	2002	2004	$5,191,685	$5,356,361	3.1%	169
150	schd. dys	2002	2004	$903,772	$1,105,275	18.2%	120
151	schd. dys	2002	2006	$6,601,236	$6,905,036	4.4%	300
152	schd. dys	2005	2007	$5,372,247	$7,272,445	26.1%	314
153	schd. dys	2005	2009	$4,578,597	$4,947,769	7.5%	180
154	schd. dys	2005	2009	$4,578,597	$4,947,769	7.5%	180
155	schd. dys	2005	2009	$4,578,597	$4,947,769	7.5%	180
156	fixed date	2002	2005	$3,217,511	$3,470,421	7.3%	141
157	schd. dys	2002	2005	$3,321,770	$3,516,278	5.5%	80
158	schd. dys	2002	2005	$3,699,714	$3,719,455	0.5%	85
159	schd. dys	2005	2008	$5,395,771	$5,754,945	6.2%	206
160	schd. dys	2002	2005	$674,020	$669,593	-0.7%	45
161	schd. dys	2002	2005	$589,128	$558,922	-5.4%	85

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
162	fixed date	2002	2005	$3,943,515	$4,277,433	7.8%	89
163	fixed date	2002	2005	$3,943,515	$4,277,433	7.8%	89
164	schd. dys	2005	2008	$3,362,382	$3,366,791	0.1%	60
165	schd. dys	2005	2008	$3,362,382	$3,366,791	0.1%	60
166	schd. dys	2005	2006	$3,058,632	$3,348,987	8.7%	120
167	schd. dys	2005	2006	$3,058,632	$3,348,987	8.7%	120
168	fixed date	2005	2009	$2,644,936	$2,691,045	1.7%	389
169	fixed date	2005	2008	$29,407,999	$33,133,711	11.2%	579
170	schd. dys	2005	2008	$21,624,300	$23,894,024	9.5%	630
171	schd. dys	2005	2008	$21,624,300	$23,894,024	9.5%	630
172	schd. dys	2005	2008	$21,624,300	$23,894,024	9.5%	630
173	schd. dys	2005	2005	$71,745	$94,898	24.4%	14

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
~~174~~	fixed date	2005	2008	$8,236,859	$10,524,854	21.7%	387
175	fixed date	2005	2007	$748,423	$841,968	11.1%	84
176	schd. dys	2005	2008	$939,122	$860,460	-9.1%	40
177	fixed date	2005	2007	$1,795,394	$1,302,747	-37.8%	426
178	schd. dys	2005	2009	$15,191,942	$17,219,626	11.8%	290
179	schd. dys	2005	2009	$15,191,942	$17,219,626	11.8%	290
180	schd. dys	2005	2009	$15,191,942	$17,219,626	11.8%	290
181	schd. dys	2005	2008	$10,913,173	$11,273,400	3.2%	150
182	schd. dys	2005	2008	$10,913,173	$11,273,400	3.2%	150
183	schd. dys	2005	2007	$2,713,891	$3,086,211	12.1%	70
184	schd. dys	2005	2007	$2,713,891	$3,086,211	12.1%	70

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
185	fixed date	2005	2008	$26,692,000	$29,544,267	9.7%	1296
186	fixed date	2005	2008	$26,692,000	$29,544,267	9.7%	1296
187	schd. dys	2005	2009	$6,060,382	$6,328,671	4.2%	95
188	schd. dys	2005	2009	$6,060,382	$6,328,671	4.2%	95
189	schd. dys	2005	2009	$6,060,382	$6,328,671	4.2%	95
190	schd. dys	2005	2008	$4,567,071	$4,950,320	7.7%	60
191	schd. dys	2005	2008	$4,567,071	$4,950,320	7.7%	60
192	fixed date	2005	2009	$5,648,000	$7,154,843.66	21.1%	422

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
193	schd. dys	2005	2010	$16,421,807	$18,986,696.50	13.5%	350
194	schd. dys	2005	2010	$3,808,890	$4,950,785.00	23.1%	151
195	schd. dys	2005	2011	$7,996,861	$9,340,057.38	14.4%	255
196	schd. dys	2005	2010	$269,275	$323,949.97	16.9%	25
197	schd. dys	2005	2010	$3,107,177	$3,516,793.22	11.6%	276
198	fixed date	2005	2010	$1,742,634	$2,017,649.11	13.6%	217
199	schd. dys	1994	1997	$12,685,163	$12,267,888	-3.4%	230
200	schd. dys	1991	1998	$2,945,554	$3,265,342	9.8%	220
201	schd. dys	1999	2000	$20,935,636	$23,233,371	9.9%	1031
202	schd. dys	1999	2000	$20,935,636	$23,233,371	9.9%	1031
203	schd. dys	1999	2000	$20,935,636	$23,233,371	9.9%	1031

No.	Schd. Restriction	Specs yr.	Letting date	CONTRACT AMOUNT (Co)	CONTRACT AMOUNT (C)	Budget variance	CONTRACT Time (To)
~~204~~	schd. dys	1999	2000	$20,935,636	$23,233,371	9.9%	1031
205				$627,516		#DIV/0!	
206				$982,400		#DIV/0!	
207				$1,500,000		#DIV/0!	
208				$261,498		#DIV/0!	
209				$257,670		#DIV/0!	
210				$387,638		#DIV/0!	
211				$192,872		#DIV/0!	
212				$40,100,000		#DIV/0!	
213				$1,224,068		#DIV/0!	

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
1	642	1		0	$1,650,000.00	$700,000.00		
2	642	1			$110,586.00			
3	202	3			$515,816.00			
4	202	1			$28,530.00	$7,000.00	700 Materials Details	700
5	202	2			$92,534.00		105.02 Plans, Shop Drawings, Working Drawings	105.02
6	483	1			$61,100.00	$27,495.00	203 Excavation and Embankment	203
7	483	3	39		$35,680.00		108.03 Schedule	108.03
8	483	2			$76,298.00		105.05 Conform to the Cont of Hot Mix Asphalt	105.05
9	483	8	21		$0.01		108.03 Schedule	108.03
10	483	4			$0.01		412 Portland Cement Concrete Pavement	412
11	483	5	14		$0.01		203 Excavation and Embankment	203
12	483	7			$0.01		504 Cribbing	504
13	483	6			$0.01		504 Cribbing	504
14	483	10	15	0	$0.00	$0.00	516 Dampproofing	516
15	483	9	10		$61,100.00		207 Topsoil	207
16	465	1	0	0	$119,861.54	$0.00	108.03 Schedule	108.03
17	704	2	2		$15,000.00			
18	704	3	0		$5,398.00			
19	704	1	0		$7,127,606.00	$4,300,000.00	203 Excavation and Embankment	203
20	338	1		0	$80,000.00	$0.00	630 Construction Zone Traffic Control	630
21	956	1		0	$63,612.00	$63,612.00	630 Construction Zone Traffic Control	630

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
22	589	3	0	0	$2,300.00	$928.50	625 Construction Surveying	625
23	589	1	0	0	$193,534.40	$0.00	203 Excavation and Embankment	203
24	589	2			$17,100.00		627 Pavement Marking	627
25	589	4			$17,442.20		212 Seeding, Fertilizer, Soil Cond, and Sod	212
26	717	1	0	0	$153,496.90	$0.00	107.15 Responsibility for Damage Claims	107.15
27	717	1	0	0	$152,472.00	$0.00	412 Portland Cement Concrete Pavement	412
28	147	1		0	$0.01	$0.00		
29	759	1		0	$50,000.00	$50,000.00	104.02 Differing Site Conditions, Suspen of Work	104.02
30	759	2			$60,495.00	$38,836.00	412 Portland Cement Concrete Pavement	412
31	269	1			$116,977.48	$59,551.38	108.03 Schedule	108.03
32	728	1			$1,498,500.00		108.03 Schedule	108.03
33	171	4	0	0	$16,536.15	$0.00		
34	171	3	0	0	$3,783.22	$0.00		
35	171	1	0	0	$981,715.54	$477,000.00	203 Excavation and Embankment	203
36	171	2	0	0	$53,710.44	$0.00	104.03 Extra Work	104.03
37	523	1			$217,052.50	$90,000.00		
38	523	2	0		$47,130.48	$0.00	109.01 Measurement of Quantities	109.01
39	262	1	0	0	$178,775.00	$62,500.00	102.04 Interpretation of Plans and Specifications	102.04
40	524	1	0		$0.01			

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
41	206	3	14	0	$163,937.89	$57,500.00		
42	206	1	25		$0.00		108.03 Schedule	108.03
43	51	1		0	$25,000.00	$0.00	108.03 Schedule	108.03
44	446	11	25	25	$128,585.25	$83,589.00	Cribbing	504
45	446	11	3	0	$30,322.62		Struc. Conc.	601
46	446	11	4	0	$20,406.51		Erosion Control	208
47	446	11	0	0	$10,000.00		Culverts & Sewers	603
48	446	11	0	0	$0.01		Cribbing	504
49	446	11	0	0	$7,746.00		Excavation & Embankment	203
50	446	11	0	0	$7,065.00		Construc. Zone Traffic Control	630
51	446	11	0	0	$119,329.00		Construc. Zone Traffic Control	630
52	7	11	0	0	$57,920.84		HMA	403
53	711	1	0		$0.01			
54	711	3	0		$7,680.00			
55	711	2	9	0	$31,592.81	$0.00	108.03 Schedule	108.03
56	91	1		0	$18,892.58	$0.00	106.05 Sampling and Testing of Hot Mix Asphalt	106.05
57	91	2		0	$10,178.00	$0.00	203 Excavation and Embankment	203
58	69	1		0	$138,620.90	$43,696.40	203 Excavation and Embankment	203

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
59	872	1			$0.01		203 Excavation and Embankment	203
60	459	1		0	$762,875.04	$36,304.70		
61	240	1		0	$13,540.09	$3,441.38	104.03 Extra Work	104.03
62	1290	3	0	0	$70,560.00	$0.00	Water Quality Control	107.25
63	1290	3	16	16	$0.01	$0.00	Determine and Extension of Contract Time	108.08
64	1290	3	1	0	$5,838.00	$0.00	Determine and Extension of Contract Time	108.08
65	167.5	1	0		$0.01			
66	409	1		0	$42,603.52	$21,000.00	300 Bases	300
67	506	1	0		$0.01		203 Excavation and Embankment	203
68	70	1			$2,445,792.00	$155,000.00	104.02 Differing Site Conditions, Suspen of Work	104.02
69	224	2	0	0	$15,929.64	$0.00		
70	224	3	0	0	$141,997.32	$0.00		
71	224	1	0	0	$43,660.19	$113,076.00	108.03 Schedule	108.03
72	881	1	0	0	$0.01	$0.00	307 Lime Treated Subgrade	307

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
73	881	1	0		$0.01	$95,598.48	104.07 Value Engineering Change Proposals	104.07
74	117	1	0	0	$122,851.00	$68,497.44	102.04 Interpretation of Plans and Specifications	102.04
75	61	1			$25,778.00		612 Delineators and Reflectors	612
76	415	1			$0.01			
77	134	2	0		$77,853.50	$20,000.00		
78	134	1	0		$7,187.50			
79	60.5	1			$14,874.00			
80	181	1	16		$511,807.72	$76,951.60	203 Excavation and Embankment	203
81	687	4		0	$12,495.00	$0.00	104.03 Extra Work	104.03
82	687	1	35	24	$0.00	$0.00	108.03 Schedule	108.03
83	687	2	15	0	$23,742.50	$0.00	106.03 Samples, Tests, Cited Specifications	106.03
84	687	3	29	19	$0.00	$0.00	200 Earthwork	200
85	687	5	0	0	$12,672.00	$4,455.00	104.03 Extra Work	104.03
86	687	7	0	0	$20,271.61	$0.00	104.03 Extra Work	104.03

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
87	687	6	24	0	$55,161.98	$0.00	104.03 Extra Work	104.03
88	687	8	70	0	$155,461.34	$0.00	104.03 Extra Work	104.03
89	687	10	0	0	$9,542.86	$9,542.86	104.03 Extra Work	104.03
90	687	12	136	27	$171,224.00	$86,990.77	108.03 Schedule	108.03
91	687	11	196	0	$1,332,832.57	$0.00	108.09 Default of Contract	108.10
92	687	9	22	0	$175,380.12	$0.00	203 Excavation and Embankment	203
93	719	1	0		$0.01		203 Excavation and Embankment	203
94	801	3	15		$58,200.00			
95	801	9	301	0	$2,394,024.22	$0.00	108.03 Schedule	108.03
96	801	3	0		$1,369,650.34			
97	801	2	111		$754,154.39			

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
98	801	1	157		$1,797,295.02			
99	801	1	60		$672,750.00			
100	801	2	20		$47,250.00			
101	801	4	0	0	$1,412,262.53	$0.00	108.03 Schedule	108.03
102	801	7	66	0	$312,150.90	$0.00	104.02 Differing Site Conditions, Suspen of Work	104.02
103	801	5	0	0	$749,959.87	$0.00	104.02 Differing Site Conditions, Suspen of Work	104.02
104	801	8	66	0	$326,049.02	$0.00	108.03 Schedule	108.03
105	801	6	0	0	$641,799.84	$0.00		
106	801	11	0	0	$9,037,369.10	$6,461,778.00		
107	801	10	0	0	$1,790,772.36	$0.00	104.03 Extra Work	104.03
108	801	15	25	0	$295,191.23	$0.00	108.03 Schedule	108.03
109	801	12	0	0	$68,649.23	$0.00	104.03 Extra Work	104.03
110	801	13	0	0	$14,429.77	$0.00	614 Traffic Control Devices	614
111	801	14	0	0	$365,397.14	$0.00	108.03 Schedule	108.03
112	280	1	0	0	$0.01	$0.00		

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
113	205	1	0	0	$155,063.56	$99,627.13	403 Hot Mix Asphalt	403
114	220	1	166	0	$535,099.51	$0.00	106.08 Storage of Materials	106.08
115	129	1		0	$46,109.26	$5,584.44	104.03 Extra Work	104.03
116	80	1	0	0	$11,142.91	$0.00	102.08 Combination or Conditional Proposals	102.08
117	269	2	0	0	$21,667.52	$0.00	Excavation and Embankment	203
118	269	2	0	0	$0.01	$0.00	Erosion Control	208
119	286	1	0		$0.01			
120	129	2	0		$0.01			
121	129	1	37	0	$192,701.75	$111,642.70	104.03 Extra Work	104.03
122	65	1			$144,444.00		109.05 Eliminated Items	109.05
123	225	1	0	0	$29,539.37	$0.00	412 Portland Cement Concrete Pavement	412
124	404	2	203	0	$3,372,141.15	$1,675,000.00	108.07 Determine and Extension of Contract Time	108.08
125	404	5	209	0	$161,452.01	$0.00		
126	404	4	0	0	$128,510.60	$0.00		
127	404	7	203	0	$118,010.25	$0.00	108.03 Schedule	108.03
128	404	1	0	0	$103,000.00	$0.00	203 Excavation and Embankment	203
129	404	6	0	0	$45,827.39	$0.00	104.03 Extra Work	104.03
130	404	3	203	0	$214,695.73	$0.00	403 Hot Mix Asphalt	403
131	296	1	0		$0.01			
132	119	1	43	43	$914,580.90	$499,000.00		

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
133	194	1	0		$288,532.00			
134	260	1	0	0	$1,798,506.47	$277,633.49	203 Excavation and Embankment	203
135	70	1	0		$0.01			
136	282	1	0	0	$60,000.00	$0.00		
137	59	1	0	0	$597,804.29	$0.00		
138	36	1	0	0	$192,328.83	$19,529.00	108.03 Schedule	108.03
139	169	1	26		$287,893.02	$238,917.00	109.10 Compensation for Compensable Delays	109.10
140	223	1	32	0	$318,925.42	$90,000.00	203 Excavation and Embankment	203
141	173	1	0	0	$79,335.96	$50,935.59	206 Excavation and Backfill for Structures	206
142	50	1	0		$0.01			
143	363	1	0	0	$137,490.61	$0.00	104.07 Value Engineering Change Proposals	104.07
144	370	1	0	0	$107,702.25	$0.00	206 Excavation and Backfill for Structures	206
145	147	2	0	0	$88,760.00	$6,515.38	105.03 Conformity to the Contract	105.03
146	147	1	0	0	$17,772.00	$11,015.92	403 Hot Mix Asphalt	403

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
147	147	3	0	10	$43,560.00	$0.00	108.03 Schedule	108.03
148	243	2	88	0	$77,085.00	$10,500.00	108.03 Schedule	108.03
149	243	1	18	0	$111,346.60	$0.00		
150	120	1	0	0	$77,372.14	$28,277.67		
151	349	1	61	0	$82,110.00	$0.00	104.02 Differing Site Conditions, Suspen of Work	104.02
152	465	1	210	0	$1,947,100.31	$956,281.95	500 Structures	500
153	196	3	0	0	$40,696.40	$0.00	Excavation and Embankment	203
154	196	3	7	2	$23,800.00	$6,800.00	Schedule	108.03
155	196	3	0	0	$3,500.00	$0.00	Water Quality Control	107.25
156	168	1	0		$622.20			
157	88	1	0	0	$31,202.25	$0.00	630 Construction Zone Traffic Control	630
158	121	1	0	0	$385,588.14	$0.00	403 Hot Mix Asphalt	403
159	206	0	0	0	$13,928.00	0	Compensation for Compensable Delays	109.10
160	52	1	0	0	$17,378.00	$17,378.00	403 Hot Mix Asphalt	403
161	102	1	0	0	$2,209.86	$936.81	105.17 Load Restrictions	105.18

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
162	293	2	6	0	$58,667.76	$0.00	403 Hot Mix Asphalt	403
163	293	1	6	0	$18,778.00	$0.00	108.08 Failure to Complete Work on Time	108.09
164	86	2	28	28	$10,500.00	0	Bituminous Materials	411
165	86	2	0	0	$30,000.00	$13,228.00	Conform to the Cont of Hot Mix Asphalt	403
166	157	1	0	0	$0.01	$0.00	203 Excavation and Embankment	203
167	157	2	0	0	$30,336.06	$0.00	104.03 Extra Work	104.03
168	462	1	0	0	$139,999.63	$0.00	Schedule	108.03
169	811	1	14	0	$0.00	$0.00	Determine and Extension of Contract Time	108.08
170	671	3	0	0	$ 513,620.00	$ -	Steel Structures	509
171	671	3	20	0	$ -	$ -	Determine and Extension of Contract Time	108.08
172	671	3	15	0	$ 15,525.00	$ 5,520.00	Waterstops and Expansion Joints	518
173	14							

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
~~174~~	521	1	0	0	$1,800,000.00	$0.00	Schedule	108.03
175	106	1	0		$734,934.99		206 Excavation and Backfill for Structures	206
176	40	1	0	0	$80,003.63	$0.00	Partial Payments	109.06
177	457	1	0	0	$460,000.00	$106,877.88	Excavation & Embankment	203
178	312	3	29	16	$ 70,479.23	$ 24,000.000	Determine and Extension of Contract Time	108.08
179	312	3	0	0	$ 63,182.00	$ 138,000.00	Excavation and Backfill for Structures	206
180	312	3	11	0	$ 65,771.00	$ -	Differing Site Conditions, Suspen of Work	104.02
181	156	2	0	0	$ 21,386.76	$ -	Plans, Shop Drawings, Working Drawings	105.02
182	156	2	0	0	$ 180,000.00	$ 28,363.000	Portland Cement Concrete Pavement	412
183	87	1	0	0	$0.01	$0.00	105.15 Inspection and Testing of Work	105.16
184	87	3	0	0	$0.01	$0.00		

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
185	1298	2	0	0	$ 23,347.94	$ -	Conformity to the Contract	105.03
186	1298	2	0	0	$ 260,074.00	$ 260,074.00	Conformity to the Contract	105.03
187	97	3	0	0	$ 67,735.00	$ 67,735.00	Portland Cement Concrete Pavement	412
188	97	3	0	0	$ 481,472.64	$ 142,013.00	Removal of Structures and Obstructions	202
189	97	3	0	0	$ 66,735.15	$ -	Conformity to Roadway Smoothness Criteria	105.08
190	69	2	0	0	$ 7,746.00	$ -	Guardrail	606
191	69	2	0	0	$ 45,000.00	$ -	Materials Details	700
192	409	1	0	0	$ 0.01	$ -	Compensate for Changes and Force Acct Work	109.04

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
193	362	1	0	20	$ 105,200.00	$ 107,446.00	Determine and Extension of Contract Time	108.08
194	167	1	0	0	$ 42,238.00	$ 42,238.00	Lighting Materials	715
195	265	1	13	0	$ 130,000.00	$ -	Drilled Caissons	503
196	35	1	9	0	$ 84,591.34	$ -	HMA	403
197	297	1	20	0	$ 96,311.03	$ -	Default of Contract	108.10
198	241	1	4	0	$ -	$ -	Default of Contract	108.10
199	433	1			$2,962,249.55		108.03 Schedule	108.03
200	243	1	0	0	$16,586.06	$0.00	108.03 Schedule	108.03
201	1057	7	10	0	$0.01	$0.00		
202	1057	2	24		$0.00			
203	1057	1	0		$0.01			

No.	CONTRACT Time (T)	# CLAIMS	CLAIMED TIME	SETT DAYS	AMT	SETT $	WORK CATEGORY	Wk. Category code
~~204~~	1057	8	42	0	$385,913.43	$240,000.00	203 Excavation and Embankment	203
205		1	0	0	$405,625.11	$0.00		
206		1	0	0	$103,258.09	$48,801.69		
207		1			$208,939.56		108.08 Failure to Complete Work on Time	108.09
208		1	0	0	$13,981.80	$0.00	614 Traffic Control Devices	614
209		1	0	0	$2,678.95	$0.00	614 Traffic Control Devices	614
210		1	0	0	$14,620.99	$13,206.63	713 Traffic Control Materials	713
211		1	0	0	$23,651.13	$0.00	102.04 Interpretation of Plans and Specifications	102.04
212							Conformity to the Contract	105.03
213		1	0	0	$ 0.01	$ -	Traffic Control Devices	614

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
1				CE/Arbitration
2				CE
3				PE
4	Plan or Spec Errors	Errors in Plans		RTD
5	Plan or Spec Errors	Plan Deficiencies	Yes	PE
6	Differing Site Condition	Other material encountered		PE
7	Time or Schedule	delays		PE
8	Material Changes/Out of Spec	Disincentive assessed		PE
9	Utility Delays	Conflict with Utility		PE
10	Plan or Spec Differing Interpretations	Payment quantity		PE
11	Plan or Spec Errors	Missing Quantites		PE
12	Plan or Spec Errors	Additional Quantities		PE
13	Plan or Spec Errors	Payment Reduction		PE
14	Time or Schedule	alternate material request		PE
15	Time or Schedule	placement		PE
16	Differing Site Condition	changed condition		RTD
17				PE
18				PE
19	Material Changes/Out of Spec	Standard Specifications	yes	RTD
20	Plan or Spec Differing Interpretations	not consistent		PE
21	Time or Schedule	additional work items		PE

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
22	Other	destroyed monument		CE/Arbitration
23	Differing Site Condition	Material change		CE/Arbitration
24	Plan or Spec Differing Interpretations			RTD
25	Plan or Spec Errors	overage of seeding quantity		PE
26	Plan or Spec Errors	utility hit		CE
27	Plan or Spec Errors	Quantity Dispute		PE
28				PE
29	Differing Site Condition	Citizen damaged vehicle		PE
30	Material Changes/Out of Spec	Deficient thinkness		PE
31	Utility Delays	utility delay		RTD
32	Utility Delays	Utility Conflicts/ROW Delays		
33				RTD
34				RTD
35	Differing Site Condition	Unstable soils		RTD
36	Differing Site Condition	Removal of material		RTD
37				RTD
38	Plan or Spec Errors	Quantity		CE
39	Plan or Spec Differing Interpretations	Shop drawings become part of Plans		CE
40				

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
41				RTD
42	Time or Schedule	material/direction delay		
43	Time or Schedule	extension of time/additional work		RTD
44	Plan or Spec Differing Interpretations	Interpretation of specification regarding payment for MSE Wall Quantities		PE
45	Plan or Spec Differing Interpretations	Right to reject and/or price reduce concrete based on concrete cores break values		DRB
46	Plan or Spec Differing Interpretations	Contractor disputes CDOT's Authority to shut down operations		PE
47	Plan or Spec Differing Interpretations	Altered Quantities		PE
48	Differing Site Condition	Contractor failed to design MSE Walls for existing field conditions		PE
49	Differing Site Condition	Contract Time		PE
50	Plan or Spec Differing Interpretations	Contractor feels CDOT is responsible for flagging compensation regardless of circumstances		PE
51	Plan or Spec Differing Interpretations	Differing expectations of quantities		PE
52	Material Changes/Out of Spec	Interpretation of Specification regarding out of spec material (SS 401.17 as well)		PE
53				PE
54				PE
55	Time or Schedule	Additional time/costs		RTD
56	Material Changes/Out of Spec	errors in procedures		CE
57	Plan or Spec Errors	Additional Quantities		CE
58	Differing Site Condition	Over excavated		CE

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
59	Differing Site Condition	Rock Conditions		PE
60	Other			CE/Arbitration
61	Plan or Spec Differing Interpretations	surveying		CE
62	Plan or Spec Differing Interpretations	Contractor is requesting additional compensation for dewatering contaminated water at Pier 4 in railyard		PE
63	Utility Delays	Contractor is requesting a compensable delay when the railroads do not allow them to work in the railyard for various reasons		PE
64	Utility Delays	Contractor is requesting excusable and compensable delays when the railroads do not allow them to work in the railyard for various reasons		PE
65				PE
66	Material Changes/Out of Spec	Materials		CE
67	Differing Site Condition	material encountered		PE
68	Plan or Spec Differing Interpretations	Everything	no	RTD
69				CE
70				CE
71	Time or Schedule	Delayed Start		CE
72	Differing Site Condition	change in condition	no	PE

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
73	Differing Site Condition	Unforeseen Conditions		PE
74	Plan or Spec Errors	Errors	yes	RTD
75	Plan or Spec Differing Interpretations	extra work		PE
76				PE
77				CE
78				PE
79				PE
80	Utility Delays	Delay	yes	RTD
81	Differing Site Condition	Equipment for shoring installation		CE
82	Time or Schedule	Delay Starting Work		CE
83	Time or Schedule	testing procedures		CE
84	Differing Site Condition	Installation of Shoring		CE
85	Differing Site Condition	Stabilization of subgrade		RTD
86	Plan or Spec Errors	Extra Work		CE/Arbitration

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
87	Differing Site Condition	Water shortage		CE/Arbitration
88	Differing Site Condition	MSE Wall		CE/Arbitration
89	Other	additional compensation		PE
90	Time or Schedule	Winter		CE/Arbitration
91	Other	Unqualified Personnel		CE/Arbitration
92	Plan or Spec Errors	Shortage		CE/Arbitration
93	Differing Site Condition			PE
94				PE
95	Time or Schedule			CE/Arbitration
96				PE
97				PE

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
98				PE
99				PE
100				PE
101	Time or Schedule	working through the winter costs		CE/Arbitration
102	Differing Site Condition	excess water		CE/Arbitration
103	Plan or Spec Errors			CE/Arbitration
104	Time or Schedule	Winter		CE/Arbitration
105				CE/Arbitration
106			yes	CE/Arbitration
107	Differing Site Condition			CE/Arbitration
108	Time or Schedule			CE/Arbitration
109	Differing Site Condition			CE/Arbitration
110	Time or Schedule			CE/Arbitration
111	Plan or Spec Errors	unclear and incomplete design		CE/Arbitration
112				PE

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
113	Material Changes/Out of Spec	removal and repaving of the bad CIP product		PE
114	Time or Schedule	Set up of batch plant on private property	yes	RTD
115	Differing Site Condition	corrective work		CE
116	Plan or Spec Differing Interpretations			CE
117	Plan or Spec Differing Interpretations	Want CDOT to pay royalties to pit owner for extra Import R40 removed from pit		PE
118	Other	Want reimbursement for superintendents time to attend required meetings.		PE
119				PE
120				PE
121	Plan or Spec Differing Interpretations	compensation/working days		CE
122	Other	Deletion of Hot Remix Treatment		PE
123	Material Changes/Out of Spec	Rejected Materials		PE
124	Utility Delays	plan and design errors, ROW issues	yes	CE/Arbitration
125			yes	CE/Arbitration
126			yes	CE/Arbitration
127	Time or Schedule	Extra work	yes	CE/Arbitration
128	Differing Site Condition	saturated materials		PE
129	Plan or Spec Errors	quantity shortages	yes	CE/Arbitration
130	Utility Delays	cost of materials		CE/Arbitration
131				PE
132				RTD

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
133				PE
134	Differing Site Condition	various	yes	PE
135				PE
136				PE
137				Court
138	Time or Schedule	Delays		RTD
139	Utility Delays	Delay		RTD
140	Other	Quanity Dispute	yes	CE
141	Differing Site Condition	difficulty - changing conditions		PE
142				PE
143	Other	Rejected Value Engineering Proposal		PE
144	Differing Site Condition	Unsuitable Foundation Material	no	CE
145	Plan or Spec Differing Interpretations	smoothness spec		PE
146	Plan or Spec Differing Interpretations	incorrectly directed to remove		PE

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
147	Time or Schedule	liquidated damages		PE
148	Time or Schedule	Delays		RTD
149				CE
150				PE
151	Differing Site Condition	MSE wall and subsurface drainage system		RTD
152	Time or Schedule	Compensable Delay and escalation	yes	PE
153	Differing Site Condition	Quantity of Unclassified Excavation was reduced. (203.02, 102.03, 104.02)		PE
154	Time or Schedule	Failure to complete contract work within contract time		PE
155	Material Changes/ Out of Spec	LD assessed for noncompliance with the stormwater construction permits and referenced standard special provision.		PE
156				PE
157	Other	Sub (KECI) does not agree with final quantities		PE
158	Other	various	Yes	RTD
159	Time or Schedule	CDOT and Contractor could not agree on additional costs for traffic control devices after winter shut down.		PE
160	Plan or Spec Errors	Various		PE
161	Other	CMO #5 Traffic Loop Repairs		RTD

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
162	Material Changes/Out of Spec	In valid test results (105.05)		RTD
163	Time or Schedule	108.07 Liquidated Damages		CE
164	Other	Asphalt Shortage, Construction Bulletins		PE
165	Material Changes/Out of Spec	Unusual variation in the element (AC test), should be placed in a separate process		RTD
166	Differing Site Condition	Work Beyond Scope		PE
167	Other	Cost of extra work greater then Contractor had bid	no	PE
168	Time or Schedule	Time required for the approval for use of embankment material which came from a clean up site		PE
169	Time or Schedule	Delays caused by construction of shoring wall and time to install additional concrete barrier at location determined by the Engineer.		PE
170	Plan or Spec Differing Interpretations	Payment for Item 509 - Temporary Bridge Deck		PE
171	Time or Schedule	Time Extension for non-critical delay		PE
172	Plan or Spec Differing Interpretations	contractor is claiming the portion of expansion devices installed in curbs is compensable		PE
173				

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
~~174~~	Plan or Spec Errors	Lack of acceptable Schedule		
175	Differing Site Condition	Unsuitable Foundation Material	yes	
176	Other	AC and Fuel Cost Adjustment		PE
177	Differing Site Condition	Unforeseen rock Conditions		CE
178	Differing Site Condition	Hamon is requesting time associated with delays caused by encountering unsuitable subgrade material at Willow Springs, the time it took CDOT to decide a resolution, and the additional time it took to repair the subgrade.		PE
179	Plan or Spec Differing Interpretations	Should Hamon be paid for flow-fill to backfill storm sewer pipe?		PE
180	Differing Site Condition	Other Work Categories as well, 104.03, 105.21, 108.07, 109. Owner Disruptions		PE
181	Plan or Spec Errors	Accuracy and Competence of the project plans		PE
182	Material Changes/Out of Spec	CDOT and the contractor don't agree on a price reduction for reduction in PCCP quality and performance. Methods for calc. the price reduction have been discussed without reaching an agreement.		PE
183	Material Changes/Out of Spec	slow notification of test results affected payment		PE
184				PE

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
185	Plan or Spec Differing Interpretations	Bridge monuments		PE
186	Plan or Spec Differing Interpretations	If quantity was included for HMA and Waterproofing on the bridge		PE
187	Differing Site Condition	412.10(rev); 412.21(rev);412.23		PE
188	Differing Site Condition	02.09(rev) Changed condition regarding depth of Removal of Asphalt (Planing)		CE
189	Plan or Spec Differing Interpretations	Interpretation of incentive/disincentive as it pertains to pavement smoothness		PE
190	Plan or Spec Differing Interpretations	Hand digging extra or included in price		PE
191	Material Changes/Out of Spec	Incorrect payment of quality incentive for HMA quality		CE
192	Other	Possible significant change in the character or nature of the work.		

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
193	Time or Schedule	Contractor wants overhead and fixed price adjustment monies derived from extension of contract time, though not asking for actual extension of contract time. Requesting reimbursement of retaining wall relocationcosts, categorized as "accel" costs.		PE
194	Plan or Spec Differing Interpretations	Local entity wanted a certain type of signal pole and the contractor provided "equal to".		PE
195	Plan or Spec Differing Interpretations	Contractor claims that 503 Drilled Caisson Spc does not address timewhen contractor completes the CSL and additional testing process especially for A+B project		PE
196	Material Changes/Out of Spec	Removal of out of specification material and material disincentives		RTD
197	Time or Schedule	Day Count Determinations		
198		Fixed Completion date missed		
199	Time or Schedule	delays		CE/Arbitration
200	Time or Schedule	delay		RTD
201				PE
202				PE
203				PE

No.	UNANT COND	BASIS OF DISPUTE	AUDITED	LEVEL CLAIM SETTLED
~~204~~	Differing Site Condition	Compensation for Rock	yes	CE
205				CE
206				CE
207	Time or Schedule	liquidated damages		CE/Arbitration
208	Plan or Spec Differing Interpretations	Quantity		PE
209	Plan or Spec Differing Interpretations	Quantities		PE
210	Other	manufactured for project and not used		RTD
211	Plan or Spec Differing Interpretations	Extra Work Not Part of Contract		PE
212	Other	Interpretation of Contract Language		PE
213	Plan or Spec Errors	Change of Condition		PE

APPENDIX B – EXAMPLE OF THE PAY ESTIMATES

COLORADO DEPARTMENT OF TRANSPORTATION

ESTIMATE RUN 01/21/2005

ESTIMATE SUMMARY

07:15:18

CONTID: C10575 ESTIMATE NO: 0025 FINL SPEC YR: 1991

PCN: 10575-BID COFRS REPORTING CATEGORY: 5 FACS REF NO:

CONTRACT DESCRIPTION: TIME CHARGED: 642.0 DAYS TIME ALLOW: 3/31/200 FIXED COMPLETION DAT

WILDCAT CR TO ROOSA AVE PERCENT TIME: 62.94 ORIG TIME ALLOW: 10/1/199 FIXED COMPLETION DAT

PROJECT NO: NH 1601-036

WILDCAT CR TO ROOSA AVE

NAME OF ROAD: S.H. 160,S.H. 550

PROJECT COUNTIES: LA PLATA

CONTRACTOR:

CASTLE ROCK CONSTRUCTION CO

P.O. BOX 1618

651 TOPEKA WAY, SUITE 100

CASTLE ROCK CO 80104 303/688-6611

PAY PERIOD ENDING	01/21/2005	DATE TIME STARTED	06/16/1997
DATE LET	04/24/1997	DATE WORK BEGAN	06/16/1997
DATE AWARDED	05/08/1997	DATE TIME STOPPED	03/19/1999
DATE CONTRACT EXECUTED	05/08/1997	DATE ACCEPTED	03/19/1999
DATE NOTICE TO PROCEED	06/16/1997		

			CURRENT TOTAL	THIS ESTIMATE
CURRENT PROJECT AMT:	$ 8,624,923.88	PARTICIPATING	$ 8,624,923.88	$ 0.00
AWARD PROJECT AMT:	$ 7,603,400.47	NON-PARTICIPATING	0.00	0.00
PERCENT COMPLETE:	100.00%	TOTAL EARNINGS	8,624,923.88	0.00
FUNDS AVAILABLE:	$ 0.00	STOCKPILED MATERIALS	0.00	0.00
		GROSS EARNINGS	8,624,923.88	0.00
TOTAL CLAIMS:	$ 0.00	RETAINAGE	0.00	0.00
		SECURITIES ENCUMBERED	0.00	0.00
		NET EARNINGS	8,624,923.88	0.00
		LIQUIDATED DAMAGES	0.00	0.00
		AUTOPAY ADJUSTMENT	0.00	0.00
		AMOUNT DUE	8,624,923.88	0.00
		OTHER ADJUSTMENTS	0.00	0.00
		PAYMENT DUE		$ 0.00

APPROVED FOR PAYMENT BY _____

PROJECT COMMENT:

ESTIMATE COMMENT:

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200	ROADWAY					
0005	202-00001	*REMOVAL OF STRUCTURE	41.000	41.000		
			EACH	0.000	0.00	
			1,350.00000	41.000		55,350.00
0010	202-00010	*REMOVAL OF TREE	44.000	44.000		
			EACH	0.000	0.00	
			150.00000	44.000		6,600.00
0015	202-00035	*REMOVAL OF PIPE	1,186.000	1,186.000		
			LF	0.000	0.00	
			21.50000	1,186.000		25,499.00
0020	202-00201	REMOVAL OF CURB	134.000	134.000		
			LF	0.000	0.00	
			2.00000	134.000		268.00
0025	202-00203	REMOVAL OF CURB AND GUTTER	17,151.000	17,151.000		
			LF	0.000	0.00	
			2.00000	17,151.000		34,302.00
0030	202-00220	*REMOVAL OF ASPHALT MAT	110,971.000	110,971.000		
			SY	0.000	0.00	
			1.51000	110,971.000		167,566.21
0035	202-00240	REMOVAL OF ASPHALT MAT (PLANING)	140.000	140.000		
			SY	0.000	0.00	
			8.00000	140.000		1,120.00
0040	202-00250	*REMOVAL OF PAVEMENT MARKING	2,807.000	2,807.000		
			SF	0.000	0.00	
			3.00000	2,807.000		8,421.00
0045	202-00425	*REMOVAL OF BRIDGE RAILING	375.000	375.000		
			LF	0.000	0.00	
			4.50000	375.000		1,687.50
0050	202-00700	REMOVAL OF LIGHT STANDARD	0.000	0.000		
			EACH	0.000	0.00	
			210.00000	0.000		0.00
0055	202-00810	REMOVAL OF GROUND SIGN	83.000	83.000		
			EACH	0.000	0.00	
			50.00000	83.000		4,150.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200 ROADWAY						
0060	202-00828	REMOVAL OF TRAFFIC SIGNAL EQUIPMENT	1.000	1.000		
			L S	0.000	0.00	
			765.00000	1.000		765.00
0065	202-01000	REMOVAL OF FENCE	471.000	471.000		
			LF	0.000	0.00	
			10.00000	471.000		4,710.00
0070	202-01130	REMOVAL OF GUARDRAIL TYPE 3	1,160.000	1,160.000		
			LF	0.000	0.00	
			3.00000	1,160.000		3,480.00
0075	202-04001	*PLUG CULVERT	6.000	6.000		
			EACH	0.000	0.00	
			300.00000	6.000		1,800.00
0080	202-04002	*CLEAN CULVERT	2.000	2.000		
			EACH	0.000	0.00	
			5,000.00000	2.000		10,000.00
0085	203-00060	EMBANKMENT MATERIAL (COMPLETE IN PLACE)	30,055.000	30,055.000		
			CY	0.000	0.00	
			13.22000	30,055.000		397,327.10
0090	203-00100	MUCK EXCAVATION	3,440.000	3,440.000		
			CY	0.000	0.00	
			10.00000	3,440.000		34,400.00
0095	203-01594	COMBINATION LOADER	194.000	194.000		
			HOUR	0.000	0.00	
			100.00000	194.000		19,400.00
0100	203-01597	*POTHOLING	281.000	281.000		
			HOUR	0.000	0.00	
			100.00000	281.000		28,100.00
0105	206-00000	*STRUCTURE EXCAVATION	14,198.000	14,198.000		
			CY	0.000	0.00	
			5.56000	14,198.000		78,940.88
0110	206-00100	*STRUCTURE BACKFILL (CLASS 1)	4,970.000	4,970.000		
			CY	0.000	0.00	
			10.00000	4,970.000		49,700.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT N00200	ROADWAY					
0115	206-00200	*STRUCTURE BACKFILL (CLASS 2)	331.000	331.000		
			CY	0.000	0.00	
			18.00000	331.000		5,958.00
0120	207-00205	TOPSOIL	1,492.000	1,492.000		
			CY	0.000	0.00	
			15.00000	1,492.000		22,380.00
0125	208-00100	SEDIMENT REMOVAL AND DISPOSAL	1.000	1.000		
			L S	0.000	0.00	
			15,000.00000	1.000		15,000.00
0130	208-00200	EROSION CONTROL SUPERVISOR	1.000	1.000		
			L S	0.000	0.00	
			15,000.00000	1.000		15,000.00
0135	210-00011	*RESET MAILBOX STRUCTURE (TYPE 1)	12.000	12.000		
			EACH	0.000	0.00	
			150.00000	12.000		1,800.00
0145	210-00013	*RESET MAILBOX STRUCTURE (TYPE 3)	12.000	12.000		
			EACH	0.000	0.00	
			300.00000	12.000		3,600.00
0150	210-00030	*RESET WATER SERVICE	12.000	12.000		
			EACH	0.000	0.00	
			800.00000	12.000		9,600.00
0155	210-00050	*RESET FIRE HYDRANT	8.000	8.000		
			EACH	0.000	0.00	
			950.00000	8.000		7,600.00
0160	210-00810	RESET GROUND SIGN	4.000	4.000		
			EACH	0.000	0.00	
			400.00000	4.000		1,600.00
0165	210-00848	RESET TRAFFIC SIGNAL CONTROLLER AND CABINET	1.000	1.000		
			EACH	0.000	0.00	
			440.00000	1.000		440.00
0170	210-04010	ADJUST MANHOLE	29.000	29.000		
			EACH	0.000	0.00	
			400.00000	29.000		11,600.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200	ROADWAY					
0175	210-04050	ADJUST VALVE BOX	42.000	42.000		
			EACH	0.000	0.00	
			200.00000	42.000		8,400.00
0180	212-00006	SEEDING (NATIVE)	7.300	7.300		
			ACRE	0.000	0.00	
			496.00000	7.300		3,620.80
0185	213-00000	MULCHING	7.300	7.300		
			ACRE	0.000	0.00	
			656.00000	7.300		4,788.80
0190	213-00061	MULCH TACKIFIER	1,397.000	1,397.000		
			LB	0.000	0.00	
			2.99000	1,397.000		4,177.03
0195	213-01000	EROSION BALES	153.000	153.000		
			EACH	0.000	0.00	
			10.00000	153.000		1,530.00
0200	216-00030	SOIL RETENTION BLANKET (SPECIAL)	1,380.000	1,380.000		
			SY	0.000	0.00	
			4.13000	1,380.000		5,699.40
0205	304-06000	*AGGREGATE BASE COURSE (CLASS 6)	1,684.320	1,684.320		
			TON	0.000	0.00	
			12.00000	1,684.320		20,211.84
0210	403-13320	*HOT BITUMINOUS PAVEMENT (GRADING C) (ASPHALT) (C 75)	1,671.760	1,671.760		
			TON	0.000	0.00	
			65.00000	1,671.760		108,664.40
0215	412-00600	CONCRETE PAVEMENT (6 INCH)	3,366.000	3,366.000		
			SY	0.000	0.00	
			23.85000	3,366.000		80,279.10
0220	412-00927	CONCRETE PAVEMENT (9-1/4 INCH) (FAST TRACK)	91,157.000	91,157.000		
			SY	0.000	0.00	
			30.46000	91,157.000		2,776,642.22
0220		MATERIAL ALLOWANCE 300A BACKFILL,ABC,HBP AGG., ETC.		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200		ROADWAY				
0220		MATERIAL ALLOWANCE 300A BACKFILL,ABC,HBP AGG., ETC.		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0220		MATERIAL ALLOWANCE 300A BACKFILL,ABC,HBP AGG., ETC.		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0225	412-01020	CONCRETE PAVEMENT (10 INCH) (FAST TRACK)	12,747.000	12,747.000		
			SY	0.000	0.00	
			31.66000	12,747.000		403,570.02
0230	420-00100	GEOTEXTILE (EROSION CONTROL) (CLASS A)	2,804.000	2,804.000		
			SY	0.000	0.00	
			2.00000	2,804.000		5,608.00
0235	506-00000	*RIPRAP	154.000	154.000		
			CY	0.000	0.00	
			150.00000	154.000		23,100.00
0240	507-00000	CONCRETE SLOPE AND DITCH PAVING	40.600	40.600		
			CY	0.000	0.00	
			269.00000	40.600		10,921.40
0245	507-00100	CONCRETE SLOPE AND DITCH PAVING (REINFORCED)	43.200	43.200		
			CY	0.000	0.00	
			300.00000	43.200		12,960.00
0250	514-00100	HAND RAIL	1,262.000	1,262.000		
			LF	0.000	0.00	
			105.50000	1,262.000		133,141.00
0250		MATERIAL ALLOWANCE 500I RAILINGS		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0250		MATERIAL ALLOWANCE 500I RAILINGS		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0250		MATERIAL ALLOWANCE 500I RAILINGS		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200	ROADWAY					
0255	601-03030	CONCRETE CLASS D (BOX CULVERT)	185.900	185.900		
			CY	0.000	0.00	
			325.00000	185.900		60,417.50
0260	601-03050	CONCRETE CLASS D (WALL)	486.700	486.700		
			CY	0.000	0.00	
			295.00000	486.700		143,576.50
0265	601-40301	STRUCTURAL CONCRETE COATING	13,013.000	13,013.000		
			SF	0.000	0.00	
			2.50000	13,013.000		32,532.50
0270	602-00000	REINFORCING STEEL	77,387.000	77,387.000		
			LB	0.000	0.00	
			0.65000	77,387.000		50,301.55
0275	603-01180	*18 INCH REINFORCED CONCRETE PIPE	2,375.000	2,375.000		
			LF	0.000	0.00	
			33.53000	2,375.000		79,633.75
0275		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0275		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0275		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0275		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0275		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0275		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200		ROADWAY				
0275		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0280	603-01240	*24 INCH REINFORCED CONCRETE PIPE	1,157.000	1,157.000		
			LF	0.000	0.00	
			42.38000	1,157.000		49,033.66
0280		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0280		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0280		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0285	603-01360	*36 INCH REINFORCED CONCRETE PIPE	820.000	820.000		
			LF	0.000	0.00	
			66.70000	820.000		54,694.00
0285		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0285		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0285		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0290	603-01720	*72 INCH REINFORCED CONCRETE PIPE	352.000	352.000		
			LF	0.000	0.00	
			244.00000	352.000		85,888.00
0295	603-01960	*96 INCH REINFORCED CONCRETE PIPE	472.000	472.000		
			LF	0.000	0.00	
			391.00000	472.000		184,552.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200		ROADWAY				
0300	603-05018	*18 INCH REINFORCED CONCRETE END SECTION	11.000	11.000		
			EACH	0.000	0.00	
			1,000.00000	11.000		11,000.00
0300		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0300		MATERIAL ALLOWANCE 603A REINFORCED CONCRETE PIPE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0305	603-05024	*24 INCH REINFORCED CONCRETE END SECTION	0.000	0.000		
			EACH	0.000	0.00	
			1,000.00000	0.000		0.00
0310	603-10109	*10 INCH CORRUGATED STEEL PIPE NESTABLE	0.000	0.000		
			LF	0.000	0.00	
			50.00000	0.000		0.00
0315	603-10180	*18 INCH CORRUGATED STEEL PIPE	172.000	172.000		
			LF	0.000	0.00	
			100.00000	172.000		17,200.00
0320	603-10240	*24 INCH CORRUGATED STEEL PIPE	115.000	115.000		
			LF	0.000	0.00	
			120.00000	115.000		13,800.00
0325	603-50012	*12 INCH PLASTIC PIPE	70.000	70.000		
			LF	0.000	0.00	
			100.00000	70.000		7,000.00
0330	604-00305	*INLET TYPE C (5 FOOT)	9.000	9.000		
			EACH	0.000	0.00	
			1,750.00000	9.000		15,750.00
0335	604-00505	*INLET TYPE D (5 FOOT)	3.000	3.000		
			EACH	0.000	0.00	
			2,160.00000	3.000		6,480.00
0340	604-13005	*INLET TYPE 13 (5 FOOT)	1.000	1.000		
			EACH	0.000	0.00	
			1,964.00000	1.000		1,964.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT N00200 ROADWAY						
0345	604-16005	*INLET TYPE 16 (5 FOOT)	6.000	6.000		
			EACH	0.000	0.00	
			2,825.00000	6.000		16,950.00
0350	604-19105	*INLET TYPE R L 5 (5 FOOT)	0.000	0.000		
			EACH	0.000	0.00	
			3,660.00000	0.000		0.00
0355	604-19110	*INLET TYPE R L 5 (10 FOOT)	2.000	2.000		
			EACH	0.000	0.00	
			3,782.00000	2.000		7,564.00
0360	604-19205	*INLET TYPE R L 10 (5 FOOT)	13.000	13.000		
			EACH	0.000	0.00	
			3,926.00000	13.000		51,038.00
0365	604-19210	*INLET TYPE R L 10 (10 FOOT)	5.000	5.000		
			EACH	0.000	0.00	
			3,956.00000	5.000		19,780.00
0370	604-19305	*INLET TYPE R L 15 (5 FOOT)	5.000	5.000		
			EACH	0.000	0.00	
			4,474.00000	5.000		22,370.00
0375	604-19310	*INLET TYPE R L 15 (10 FOOT)	4.000	4.000		
			EACH	0.000	0.00	
			5,000.00000	4.000		20,000.00
0380	604-19410	*INLET TYPE R SPECIAL (10 FOOT)	3.000	3.000		
			EACH	0.000	0.00	
			5,200.00000	3.000		15,600.00
0385	604-25006	*VANE GRATE INLET SPECIAL (5 FOOT)	4.000	4.000		
			EACH	0.000	0.00	
			5,766.00000	4.000		23,064.00
0390	604-30005	*MANHOLE SLAB BASE (5 FOOT)	1.000	1.000		
			EACH	0.000	0.00	
			1,500.00000	1.000		1,500.00
0395	604-31015	*MANHOLE BOX BASE (15 FOOT)	2.000	2.000		
			EACH	0.000	0.00	
			2,800.00000	2.000		5,600.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200 ROADWAY						
0400	604-39015	*MANHOLE SPECIAL (15 FOOT)	1.000	1.000		
			EACH	0.000	0.00	
			5,400.00000	1.000		5,400.00
0405	604-51012	*12 INCH SLOTTED PIPE INLET	45.000	45.000		
			LF	0.000	0.00	
			250.00000	45.000		11,250.00
0410	605-00040	*4 INCH PERFORATED PIPE UNDERDRAIN	2,107.000	2,107.000		
			LF	0.000	0.00	
			10.00000	2,107.000		21,070.00
0415	605-83002	*GEOCOMPOSITE DRAIN WITH PIPE	1,344.000	1,344.000		
			SY	0.000	0.00	
			3.40000	1,344.000		4,569.60
0420	605-84000	*SUBSURFACE DRAIN OUTLET	90.000	90.000		
			LF	0.000	0.00	
			20.00000	90.000		1,800.00
0425	606-00301	GUARDRAIL TYPE 3 (6-3 POST SPACING)	1,607.000	1,607.000		
			LF	0.000	0.00	
			12.40000	1,607.000		19,926.80
0430	606-01340	END ANCHORAGE TYPE 3D	1.000	1.000		
			EACH	0.000	0.00	
			500.00000	1.000		500.00
0435	606-01370	END ANCHORAGE TYPE 3G	4.000	4.000		
			EACH	0.000	0.00	
			800.00000	4.000		3,200.00
0440	606-02001	END ANCHORAGE (SLOTTED RAIL TERMINAL)	4.000	4.000		
			EACH	0.000	0.00	
			1,800.00000	4.000		7,200.00
0445	606-11010	*BRIDGE RAIL TYPE 10R	374.000	374.000		
			LF	0.000	0.00	
			50.00000	374.000		18,700.00
0450	607-11580	*FENCE (TEMPORARY)	3,199.000	3,199.000		
			LF	0.000	0.00	
			3.50000	3,199.000		11,196.50

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200 ROADWAY						
0455	608-00000	CONCRETE SIDEWALK	8,778.000	8,778.000		
			SY	0.000	0.00	
			17.95000	8,778.000		157,565.10
0460	608-00010	CONCRETE CURB RAMP	214.000	214.000		
			SY	0.000	0.00	
			26.55000	214.000		5,681.70
0465	609-20010	CURB TYPE 2 (SECTION B)	676.000	676.000		
			LF	0.000	0.00	
			8.50000	676.000		5,746.00
0470	609-21020	CURB AND GUTTER TYPE 2 (SECTION II-B)	19,387.000	19,387.000		
			LF	0.000	0.00	
			8.47000	19,387.000		164,207.89
0475	609-24006	GUTTER TYPE 2 (6 FOOT)	414.000	414.000		
			LF	0.000	0.00	
			30.00000	414.000		12,420.00
0480	610-00030	MEDIAN COVER MATERIAL (CONCRETE)	404.000	404.000		
			SF	0.000	0.00	
			2.00000	404.000		808.00
0485	612-00041	DELINEATOR (FLEXIBLE) (TYPE I)	48.000	48.000		
			EACH	0.000	0.00	
			18.75000	48.000		900.00
0490	612-00042	DELINEATOR (FLEXIBLE) (TYPE II)	15.000	15.000		
			EACH	0.000	0.00	
			19.75000	15.000		296.25
0495	613-01200	2 INCH ELECTRICAL CONDUIT (PLASTIC)	2,263.000	2,263.000		
			LF	0.000	0.00	
			7.20000	2,263.000		16,293.60
0495		MATERIAL ALLOWANCE 613A ELECTRICAL CONDUIT		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0500	613-01300	3 INCH ELECTRICAL CONDUIT (PLASTIC)	23,678.000	23,678.000		
			LF	0.000	0.00	
			7.60000	23,678.000		179,952.80

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200		ROADWAY				
0500		MATERIAL ALLOWANCE 613A ELECTRICAL CONDUIT		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0500		MATERIAL ALLOWANCE 613A ELECTRICAL CONDUIT		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0500		MATERIAL ALLOWANCE 613A ELECTRICAL CONDUIT		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0500		MATERIAL ALLOWANCE 613A ELECTRICAL CONDUIT		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0505	613-10000	WIRING	1.000	1.000		
			L S	0.000	0.00	
			4,100.00000	1.000		4,100.00
0510	613-30400	LIGHT STANDARD ALUMINUM (40 FOOT)	102.000	102.000		
			EACH	0.000	0.00	
			1,472.00000	102.000		150,144.00
0510		MATERIAL ALLOWANCE 613K LIGHT STANDARDS		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0510		MATERIAL ALLOWANCE 613K LIGHT STANDARDS		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0510		MATERIAL ALLOWANCE 613K LIGHT STANDARDS		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0515	613-30402	LIGHT STANDARD ALUMINUM (40 FOOT) (2-ARM)	3.000	3.000		
			EACH	0.000	0.00	
			1,695.00000	3.000		5,085.00
0520	613-40000	CONCRETE FOUNDATION PAD	95.000	95.000		
			EACH	0.000	0.00	
			465.00000	95.000		44,175.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200		ROADWAY				
0525	613-70250	LUMINAIRE HIGH PRESSURE SODIUM (250 WATT)	108.000	108.000		
			EACH	0.000	0.00	
			315.00000	108.000		34,020.00
0525		MATERIAL ALLOWANCE 613J LUMINAIRE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0525		MATERIAL ALLOWANCE 613J LUMINAIRE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0525		MATERIAL ALLOWANCE 613J LUMINAIRE		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0530	613-70400	LUMINAIRE HIGH PRESSURE SODIUM (400 WATT)	2.000	2.000		
			EACH	0.000	0.00	
			348.00000	2.000		696.00
0535	614-00011	SIGN PANEL (CLASS I)	250.000	250.000		
			SF	0.000	0.00	
			18.50000	250.000		4,625.00
0540	614-00012	SIGN PANEL (CLASS II)	247.000	247.000		
			SF	0.000	0.00	
			19.25000	247.000		4,754.75
0545	614-00013	SIGN PANEL (CLASS III)	367.000	367.000		
			SF	0.000	0.00	
			21.75000	367.000		7,982.25
0550	614-00044	TIMBER SIGN POST 4X4 INCH	343.000	343.000		
			LF	0.000	0.00	
			8.00000	343.000		2,744.00
0555	614-00066	TIMBER SIGN POST 6X6 INCH	636.000	636.000		
			LF	0.000	0.00	
			9.00000	636.000		5,724.00
0560	614-00200	STEEL SIGN POST (U-2)	244.000	244.000		
			LF	0.000	0.00	
			6.00000	244.000		1,464.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200 ROADWAY						
0565	614-00612	STEEL SIGN POST (W 6X12)	95.000	95.000		
			LF	0.000	0.00	
			34.00000	95.000		3,230.00
0570	614-00615	STEEL SIGN POST (W 6X15)	14.000	14.000		
			LF	0.000	0.00	
			36.00000	14.000		504.00
0575	614-03001	CONCRETE FOOTING (TYPE 1)	7.000	7.000		
			EACH	0.000	0.00	
			550.00000	7.000		3,850.00
0580	614-03002	CONCRETE FOOTING (TYPE 2)	1.000	1.000		
			EACH	0.000	0.00	
			650.00000	1.000		650.00
0585	614-70336	TRAFFIC SIGNAL FACE (12-12-12)	10.000	10.000		
			EACH	0.000	0.00	
			520.00000	10.000		5,200.00
0590	614-70560	TRAFFIC SIGNAL FACE (12-12-12-12-12)	2.000	2.000		
			EACH	0.000	0.00	
			580.00000	2.000		1,160.00
0595	614-72860	PEDESTRIAN PUSH BUTTON	2.000	2.000		
			EACH	0.000	0.00	
			270.00000	2.000		540.00
0600	614-72864	FIRE PREEMPTION UNIT	1.000	1.000		
			EACH	0.000	0.00	
			5,735.00000	1.000		5,735.00
0605	614-72871	LOOP DETECTOR WIRE (PREFAB) SPECIAL	0.000	0.000		
			LF	0.000	0.00	
			12.22000	0.000		0.00
0610	614-72878	TRAFFIC SIGNAL VEHICLE DETECTOR AMPLIFIER (LOOP TYPE)	2.000	2.000		
			EACH	0.000	0.00	
			925.00000	2.000		1,850.00
0615	614-72882	TRAFFIC SIGNAL VEHICLE DETECTOR (MICRO TYPE)	7.000	7.000		
			EACH	0.000	0.00	
			515.00000	7.000		3,605.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT N00200		ROADWAY				
0620	614-81010	TRAFFIC SIGNAL-LIGHT POLE STEEL (1 MAST ARM)	2.000	2.000		
			EACH	0.000	0.00	
			6,810.00000	2.000		13,620.00
0620		MATERIAL ALLOWANCE 614L TRAFFIC SIGNAL POLE STEEL		0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0625	614-82010	TRAFFIC SIGNAL POLE STEEL (1 MAST ARM)	1.000	1.000		
			EACH	0.000	0.00	
			4,750.00000	1.000		4,750.00
0630	614-84000	TRAFFIC SIGNAL PEDESTAL POLE STEEL	1.000	1.000		
			EACH	0.000	0.00	
			1,080.00000	1.000		1,080.00
0635	621-00450	*DETOUR PAVEMENT	5,537.000	5,537.000		
			SY	0.000	0.00	
			20.00000	5,537.000		110,740.00
0640	625-00000	*CONSTRUCTION SURVEYING	1.000	1.000		
			L S	0.000	0.00	
			90,000.00000	1.000		90,000.00
0645	626-00000	*MOBILIZATION	1.000	1.000		
			L S	0.000	0.00	
			480,000.00000	1.000		480,000.00
0650	627-00001	*PAVEMENT MARKING PAINT	423.000	423.000		
			GAL	0.000	0.00	
			30.00000	423.000		12,690.00
0655	627-00005	EPOXY PAVEMENT MARKING	208.000	208.000		
			GAL	0.000	0.00	
			125.00000	208.000		26,000.00
0660	627-30305	*PREFORMED PLASTIC PAVEMENT MARKING (60 MIL) (WORD-SYMBOL)	124.000	124.000		
			SF	0.000	0.00	
			15.00000	124.000		1,860.00
0665	627-30310	*PREFORMED PLASTIC PAVEMENT MARKING (60 MIL) (XWALK-STOP	168.000	168.000		
			SF	0.000	0.00	
			15.00000	168.000		2,520.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200 ROADWAY						
0670	629-01001	*SURVEY MONUMENT (TYPE 1)	123.000	123.000		
			EACH	0.000	0.00	
			100.00000	123.000		12,300.00
0675	629-01005	*SURVEY MONUMENT (TYPE 5)	78.000	78.000		
			EACH	0.000	0.00	
			200.00000	78.000		15,600.00
0680	630-00000	*FLAGGING	14,772.000	14,772.000		
			HOUR	0.000	0.00	
			19.00000	14,772.000		280,668.00
0685	630-00002	*TRAFFIC CONTROL SUPERVISOR	361.000	361.000		
			DAY	0.000	0.00	
			275.00000	361.000		99,275.00
0690	630-00003	*UNIFORMED TRAFFIC CONTROL	0.000	0.000		
			HOUR	0.000	0.00	
			50.00000	0.000		0.00
0695	630-00007	*TRAFFIC CONTROL INSPECTION	118.000	118.000		
			DAY	0.000	0.00	
			110.00000	118.000		12,980.00
0700	630-80001	*FLASHING BEACON (PORTABLE)	2.000	2.000		
			EACH	0.000	0.00	
			500.00000	2.000		1,000.00
0705	630-80336	*BARRICADE (TYPE 3 M-B) (TEMPORARY)	6.000	6.000		
			EACH	0.000	0.00	
			350.00000	6.000		2,100.00
0710	630-80341	*CONSTRUCTION TRAFFIC SIGN (PANEL SIZE A)	42.000	42.000		
			EACH	0.000	0.00	
			75.00000	42.000		3,150.00
0715	630-80342	*CONSTRUCTION TRAFFIC SIGN (PANEL SIZE B)	84.000	84.000		
			EACH	0.000	0.00	
			75.00000	84.000		6,300.00
0720	630-80344	*CONSTRUCTION TRAFFIC SIGN (SPECIAL)	432.000	432.000		
			SF	0.000	0.00	
			15.00000	432.000		6,480.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200 ROADWAY						
0725	630-80358	*ADVANCE WARNING FLASHING OR SEQUENCING ARROW PANEL (C TYPE)	4.000	4.000		
			EACH	0.000	0.00	
			2,500.00000	4.000		10,000.00
0730	630-80360	*DRUM CHANNELIZING DEVICE	628.000	628.000		
			EACH	0.000	0.00	
			60.00000	628.000		37,680.00
0735	630-80363	*DRUM CHANNELIZING DEVICE (WITH LIGHT) (FLASHING)	20.000	20.000		
			EACH	0.000	0.00	
			60.00000	20.000		1,200.00
0740	630-80370	CONCRETE BARRIER (TEMPORARY)	0.000	0.000		
			LF	0.000	0.00	
			25.00000	0.000		0.00
0745	630-80380	*TRAFFIC CONE	282.000	282.000		
			EACH	0.000	0.00	
			10.00000	282.000		2,820.00
0750	630-86800	TRAFFIC SIGNAL (TEMPORARY)	1.000	1.000		
			L S	0.000	0.00	
			7,800.00000	1.000		7,800.00
0755	700-70010	F/A MINOR CONTRACT REVISIONS	0.000	0.000		
			F A	0.000	0.00	
			1.00000	0.000		0.00
0760	700-70020	F/A ON-THE-JOB TRAINEE	0.000	0.000		
			EACH	0.000	0.00	
			1.00000	0.000		0.00
0765	700-70022	F/A OJT PILOT	4,276.800	4,276.800		
			F A	0.000	0.00	
			1.00000	4,276.800		4,276.80
0770	700-70028	F/A ESB PROGRAM	0.000	0.000		
			F A	0.000	0.00	
			1.00000	0.000		0.00
0775	700-70080	F/A FURNISH METER AND OVERHEAD METER LOOP	0.000	0.000		
			F A	0.000	0.00	
			1.00000	0.000		0.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT N00200 ROADWAY						
0780	700-70380	F/A EROSION CONTROL	0.000	0.000		
			F A	0.000	0.00	
			1.00000	0.000		0.00
0800	900-00010	ADDED ITEM (HOUR)/ MCR #1 PLUMBING CREW	87.000	87.000		
			HOUR	0.000	0.00	
			165.00000	87.000		14,355.00
0805	900-00006	ADDED ITEM (DOLLAR)/ MCR #2 PARTNERING	3,132.620	3,132.620		
			DOL	0.000	0.00	
			1.00000	3,132.620		3,132.62
0810	900-00006	ADDED ITEM (DOLLAR)/ MCR #3 LONG DISTANCE	1,409.710	1,409.710		
			DOL	0.000	0.00	
			1.00000	1,409.710		1,409.71
0815	900-00007	ADDED ITEM (EACH)/ MCR #4 CONCRETE COLLAR	3.000	3.000		
			EACH	0.000	0.00	
			400.00000	3.000		1,200.00
0820	900-00004	ADDED ITEM (CUBIC YARD)/ MCR #5 FLOW-FILL	560.000	560.000		
			CY	0.000	0.00	
			55.00000	560.000		30,800.00
0825	900-00004	ADDED ITEM (CUBIC YARD)/ MCR #6 CONCRETE (CLASSB)(WALL)	15.000	15.000		
			CY	0.000	0.00	
			290.00000	15.000		4,350.00
0830	900-00010	ADDED ITEM (HOUR)/ MCR #7 LABORER	416.000	416.000		
			HOUR	0.000	0.00	
			22.00000	416.000		9,152.00
0835	900-00005	ADDED ITEM (DAY)/ MCR #8 LIGHT PLANT	2.000	2.000		
			DAY	0.000	0.00	
			210.00000	2.000		420.00
0840	900-00004	ADDED ITEM (CUBIC YARD)/ MCR #9 PIT RUN MATERIAL	31.000	31.000		
			CY	0.000	0.00	
			10.00000	31.000		310.00
0845	900-00004	ADDED ITEM (CUBIC YARD)/ MCR #10 3" CRUSHED ROCK	348.000	348.000		
			CY	0.000	0.00	
			14.00000	348.000		4,872.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200 ROADWAY						
0850	900-00010	ADDED ITEM (HOUR)/ MCR #11 FLAGGING (SHIFT 2)	24.000	24.000		
			HOUR	0.000	0.00	
			21.00000	24.000		504.00
0855	900-00007	ADDED ITEM (EACH)/ MCR #12 TREE TRIMMING	11.000	11.000		
			EACH	0.000	0.00	
			190.00000	11.000		2,090.00
0860	900-00024	ADDED ITEM (TON)/ MCR #13 FURNISH HBP	1.000	1.000		
			TON	0.000	0.00	
			28.00000	1.000		28.00
0865	900-00004	ADDED ITEM (CUBIC YARD)/ MCR #14 THRUST BLOCK CONCRETE	22.700	22.700		
			CY	0.000	0.00	
			70.00000	22.700		1,589.00
0870	900-00006	ADDED ITEM (DOLLAR)/ SUPPLIER LIEN- OUTLAW TRUCKING	0.000	0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0875	900-00004	ADDED ITEM (CUBIC YARD)/ MCR #15 FLOW-FILL (SAND BASED)	172.000	172.000		
			CY	0.000	0.00	
			59.00000	172.000		10,148.00
0880	203-00000	UNCL EXCAV EMBANKMENT HAUL	3,211.000	3,211.000		
			CY	0.000	0.00	
			6.72000	3,211.000		21,577.92
0885	604-00310	INLET TY C (10 FT) MCR #16	1.000	1.000		
			EACH	0.000	0.00	
			2,625.00000	1.000		2,625.00
0890	900-00012	ADDED ITEM (FOOT)/ MCR #17 CONCRETE SAWING	31.000	31.000		
			LF	0.000	0.00	
			28.00000	31.000		868.00
0895	900-00012	ADDED ITEM (FOOT)/ MCR #18 BITUMINOUS CURB	548.000	548.000		
			LF	0.000	0.00	
			8.50000	548.000		4,658.00
0900	700-70035	F/A MCR #19 F/A CONCRETE PATCH	841.080	841.080		
			F A	0.000	0.00	
			1.00000	841.080		841.08

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT N00200 ROADWAY						
0905	900-00004	ADDED ITEM (CUBIC YARD)/ MCR #20 FLOW-FILL (PIPE-FILL)	138.000	138.000		
			CY	0.000	0.00	
			55.00000	138.000		7,590.00
0910	900-00006	ADDED ITEM (DOLLAR)/ WITHHOLD IRONWORKER WAGES	0.000	0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0915	900-00006	ADDED ITEM (DOLLAR)/ WITHHOLD FRINGE BENEFITS	0.000	0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0920	612-00003	DELIN (TY III) MCR #22 DELINEATORS (TYPE III)	4.000	4.000		
			EACH	0.000	0.00	
			15.00000	4.000		60.00
0925	900-00014	ADDED ITEM (LUMP SUM)/ MCR #23 UTILITIES (WATER)	1.000	1.000		
			L S	0.000	0.00	
			7,000.00000	1.000		7,000.00
0930	900-00014	ADDED ITEM (LUMP SUM)/ MCR #24 UTILITIES (GAS)	1.000	1.000		
			L S	0.000	0.00	
			6,100.00000	1.000		6,100.00
0935	900-00006	ADDED ITEM (DOLLAR)/ SUPPLIER LIEN - ABC STORAGE	0.000	0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0940	900-00006	ADDED ITEM (DOLLAR)/ SUPPLIER LIEN - GRAND JUNCTION PIPE	0.000	0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0945	900-00014	ADDED ITEM (LUMP SUM)/ MCR #25 UTILITES (3" GAS LINE)	1.000	1.000		
			L S	0.000	0.00	
			1,400.00000	1.000		1,400.00
0950	900-00006	ADDED ITEM (DOLLAR)/ SUPPLIER LIEN - BEDTR INDUSTRIES	0.000	0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0955	700-70035	F/A MCR #26 F/A HAUL BARRIER	2,086.560	2,086.560		
			F A	0.000	0.00	
			1.00000	2,086.560		2,086.56

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200 ROADWAY						
0960	900-00014	ADDED ITEM (LUMP SUM)/ MCR #27 UTILITIES (LOADING)	1.000	1.000		
			L S	0.000	0.00	
			685.00000	1.000		685.00
0965	900-00007	ADDED ITEM (EACH)/ MCR #28 CONCRETE COLLAR (36")	3.000	3.000		
			EACH	0.000	0.00	
			600.00000	3.000		1,800.00
0970	900-00014	ADDED ITEM (LUMP SUM)/ MCR #29 MATERIALS (CITY-6" WATER)	1.000	1.000		
			L S	0.000	0.00	
			7,340.51000	1.000		7,340.51
0975	900-00014	ADDED ITEM (LUMP SUM)/ MCR #30 MATERIALS (CITY-10")	1.000	1.000		
			L S	0.000	0.00	
			3,794.09000	1.000		3,794.09
0980	900-00010	ADDED ITEM (HOUR)/ MCR #31 CARPENTER	288.000	288.000		
			HOUR	0.000	0.00	
			30.50000	288.000		8,784.00
0985	900-00006	ADDED ITEM (DOLLAR)/ SUPPLIER LIEN - DILLON CRANE	0.000	0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
0990	900-00012	ADDED ITEM (FOOT)/ MCR #32 CONCRETE BARRIER (REMOVE)	922.000	922.000		
			LF	0.000	0.00	
			3.00000	922.000		2,766.00
0995	900-00010	ADDED ITEM (HOUR)/ MCR #33 SURVEYING (DIRECTED)	95.000	95.000		
			HOUR	0.000	0.00	
			100.00000	95.000		9,500.00
1000	900-00010	ADDED ITEM (HOUR)/ MCR #34 SPRINKLER REPAIR	207.000	207.000		
			HOUR	0.000	0.00	
			42.50000	207.000		8,797.50
1005	900-00014	ADDED ITEM (LUMP SUM)/ MCR #35 18" CSP END SECTIONS	1.000	1.000		
			L S	0.000	0.00	
			1,000.00000	1.000		1,000.00
1010	700-70035	F/A MCR #36 6" IRRIGATION LINE	3,171.810	3,171.810		
			F A	0.000	0.00	
			1.00000	3,171.810		3,171.81

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200 ROADWAY						
1015	900-00007	ADDED ITEM (EACH)/ MCR #37 PIPE CLEAN	3.000	3.000		
			EACH	0.000	0.00	
			1,000.00000	3.000		3,000.00
1020	900-00012	ADDED ITEM (FOOT)/ MCR # 38 PREFORMED PLASTIC TAPE	299.000	299.000		
			LF	0.000	0.00	
			3.40000	299.000		1,016.60
1025	900-00007	ADDED ITEM (EACH)/ MCR #39 CONST. SIGN (PANEL C)	10.000	10.000		
			EACH	0.000	0.00	
			150.00000	10.000		1,500.00
1030	900-00007	ADDED ITEM (EACH)/ CMO #3 LOOP DETECTORS	11.000	11.000		
			EACH	0.000	0.00	
			838.17000	11.000		9,219.87
1035	900-00006	ADDED ITEM (DOLLAR)/ MCR #42 PRICE REDUCE CONCRETE (CLASS P)	-2,059.430	-2,059.430		
			DOL	0.000	0.00	
			1.00000	-2,059.430		-2,059.43
1040	900-00010	ADDED ITEM (HOUR)/ MCR #43 BLADING	24.000	24.000		
			HOUR	0.000	0.00	
			85.00000	24.000		2,040.00
1045	900-00010	ADDED ITEM (HOUR)/ MCR #44 TRUCK (HAUL)	19.000	19.000		
			HOUR	0.000	0.00	
			65.00000	19.000		1,235.00
1050	900-00012	ADDED ITEM (FOOT)/ MCR #45 CONDUIT (2" PLASTIC)	366.000	366.000		
			LF	0.000	0.00	
			3.26000	366.000		1,193.16
1055	900-00012	ADDED ITEM (FOOT)/ MCR #46 CONDUIT (3" PLASTIC)	248.000	248.000		
			LF	0.000	0.00	
			4.74000	248.000		1,175.52
1060	700-70035	F/A MCR #48 SPREAD FOOTING LIGHT BASE	1,754.820	1,754.820		
			F A	0.000	0.00	
			1.00000	1,754.820		1,754.82
1065	900-00004	ADDED ITEM (CUBIC YARD)/ MCR #49 1-1/2" WASHED ROCK (CIP)	37.000	37.000		
			CY	0.000	0.00	
			26.00000	37.000		962.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT NO0200 ROADWAY						
1070	900-00007	ADDED ITEM (EACH)/ MCR # 50 LIGHT BASE (SPREAD)	8.000	8.000		
			EACH	0.000	0.00	
			1,750.00000	8.000		14,000.00
1075	900-00012	ADDED ITEM (FOOT)/ MCR #51 GUARDRAIL (TYPE 3 - ADDITIONAL)	25.000	25.000		
			LF	0.000	0.00	
			5.50000	25.000		137.50
1080	900-00024	ADDED ITEM (TON)/ MCR #52 HBP (GRADING CX)	2,077.430	2,077.430		
			TON	0.000	0.00	
			65.00000	2,077.430		135,032.95
1085	900-00004	ADDED ITEM (CUBIC YARD)/ CMO #5 ADDITIONAL RIPRAP	999.000	999.000		
			CY	0.000	0.00	
			55.00000	999.000		54,945.00
1090	900-00006	ADDED ITEM (DOLLAR)/ PRICE REDUCE ASPHALT	-24,988.120	-24,988.130		
			DOL	0.000	0.00	
			1.00000	-24,988.130		-24,988.13
1095	900-00021	ADDED ITEM (SQUARE FOOT)/ MCR #53 SOD	21,000.000	21,000.000		
			SF	0.000	0.00	
			0.70000	21,000.000		14,700.00
1100	900-00007	ADDED ITEM (EACH)/ MCR #54 CLEAN CBC	2.000	2.000		
			EACH	0.000	0.00	
			6,800.00000	2.000		13,600.00
1105	900-00006	ADDED ITEM (DOLLAR)/ SUPPLIER LIEN - PATENT SYSTEMS	0.000	0.000		
			DOL	0.000	0.00	
			1.00000	0.000		0.00
1110	700-70035	F/A MCR #55 F/A CONCRETE WORK	61,488.430	61,488.430		
			F A	0.000	0.00	
			1.00000	61,488.430		61,488.43
1115	900-00014	ADDED ITEM (LUMP SUM)/ MCR #56 BIKEPATH LIGHTING	1.000	1.000		
			L S	0.000	0.00	
			7,685.00000	1.000		7,685.00
1120	900-00021	ADDED ITEM (SQUARE FOOT)/ MCR #57 SANDBLASTING	20,965.000	20,965.000		
			SF	0.000	0.00	
			1.00000	20,965.000		20,965.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT N00200 ROADWAY						
1125	900-00014	ADDED ITEM (LUMP SUM)/ MCR #59 STOCKPILE HANDRAIL	1.000	1.000		
			L S	0.000	0.00	
			2,434.72000	1.000		2,434.72
1130	900-00007	ADDED ITEM (EACH)/ MCR #60 VERTICAL PANELS	25.000	25.000		
			EACH	0.000	0.00	
			45.00000	25.000		1,125.00
1135	900-00006	ADDED ITEM (DOLLAR)/ MCR # 61 SAW LOOP DETECTORS	2,516.450	2,516.450		
			DOL	0.000	0.00	
			1.00000	2,516.450		2,516.45
1140	700-70035	F/A MCR #62 LOWER PHONE LINE	3,337.440	3,337.440		
			F A	0.000	0.00	
			1.00000	3,337.440		3,337.44
1145	700-70035	F/A MCR #63 REMOVE RETAINING WALL	945.410	945.410		
			F A	0.000	0.00	
			1.00000	945.410		945.41
1150	700-70035	F/A MCR #64 PARKING CURB WALL	8,706.890	8,706.890		
			F A	0.000	0.00	
			1.00000	8,706.890		8,706.89
1155	203-00040	UNCL EXCAV (SPEC) CMO #8 UNCL EXCAV/STOCKPILE HAUL	19,056.000	19,056.000		
			CY	0.000	0.00	
			1.42000	19,056.000		27,059.52
1165	900-00014	ADDED ITEM (LUMP SUM)/ MCR #65 ARBITRATION BOARD PAYMENT	1.000	1.000		
			L S	0.000	0.00	
			38,122.59000	1.000		38,122.59
1170	900-00014	ADDED ITEM (LUMP SUM)/ ARBITRATION BOARD PAYMENT PLUS ADDITIONAL INTEREST	0.000	0.000		
			L S	0.000	0.00	
			38,687.15000	0.000		0.00
1175	900-00014	ADDED ITEM (LUMP SUM)/ CHANGE CATEGORY FROM 400 TO 200	188,322.000	188,322.000		
			L S	0.000	0.00	
			1.00000	188,322.000		188,322.00

REF NO.	ITEM NO.	ITEM DESCRIPTION	CURRENT QUANTITY/ UNITS UNIT PRICE	PREV QTY/ QTY THIS PERIOD QTY TO DATE	AMOUNT THIS PERIOD	CUMULATIVE AMOUNT
CAT N00200	ROADWAY					
1180	900-00006	ADDED ITEM (DOLLAR)/ ARBITATION PAYMENT TO CRCC	564.560	564.560		
			DOL	0.000	0.00	
			1.00000	564.560		564.56
		CAT 0200	CURRENT AMT $	8,594,723.88	$ 0.00	$ 8,594,723.87
CAT N00400	CONSTRUCTION ENGINEERING BID ITEMS					
0785	620-00002	FIELD OFFICE (CLASS 2)	1.000	1.000		
			EACH	0.000	0.00	
			15,800.00000	1.000		15,800.00
0790	620-00012	FIELD LABORATORY (CLASS 2)	1.000	1.000		
			EACH	0.000	0.00	
			12,900.00000	1.000		12,900.00
0795	620-00020	SANITARY FACILITY	1.000	1.000		
			EACH	0.000	0.00	
			1,500.00000	1.000		1,500.00
1160	900-00014	ADDED ITEM (LUMP SUM)/ CMO #9 CLAIM SETTLEMENT	1.000	1.000		
			L S	0.000	0.00	
			188,322.00000	1.000		188,322.00
1190	900-00014	ADDED ITEM (LUMP SUM)/ CMO #9 CORRECTION	-1.000	-1.000		
			L S	0.000	0.00	
			188,322.00000	-1.000		-188,322.00
		CAT 0400	CURRENT AMT $	30,200.00	$ 0.00	$ 30,200.00
		PROJECT TOTAL	CURRENT AMT $	8,624,923.88	$ 0.00	$ 8,624,923.87

APPENDIX C – PROJECT LISTINGS

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
1	2/5/2003	2	STA 012A-038	14199	1	$953,785.40	$1,348,858.04	$395,072.64	41%	35
2	3/6/2003	2	NH 1603-019	14206	1	$537,084.00	$483,658.91	-$53,425.09	-10%	40
3	3/10/2003	1	BR 0831-085	13398	1	$3,238,426.00	$3,720,204.67	$481,778.67	15%	112
4	3/14/2003	2	IM 0252-362	14350	1	$1,493,932.74	$1,718,174.25	$224,241.51	15%	105
5	4/8/2003	5	NH 0502-054	13869	1	$1,466,128.86	$1,590,448.76	$124,319.90	8%	90
6	5/7/2003	1	BR 0703-283	14014	1	$478,228.00	$399,446.00	$78,782.00	-16%	70
7	5/27/2003	1	NH 2854-099	14353	1	$737,038.13	$711,002.21	$26,035.92	-4%	50
8	6/27/2003	5	STA 5502-040	13941	1	$1,227,062.00	$1,666,300.00	-$439,238.00	36%	75
9	6/30/2003	3	STR 135A-022	13965	1	$6,157,808.95	$7,048,015.00	-$890,206.05	14%	200
10	7/2/2003	2	STA 083A-031	14304	0	$1,765,662.60	$1,643,912.65	$121,749.95	-7%	60
11	7/15/2003	4	STA 0343-021	13528	0	$5,399,161.60	$5,760,055.56	-$360,893.96	7%	120
12	7/21/2003	6	C R600-208	14509	0	$1,502,439.34	$1,009,170.01	$493,269.33	-33%	125
13	7/21/2003	4	C 0142-040	14313	0	$271,774.50	$263,688.56	$8,085.94	-3%	45
14	7/25/2003	2	STA 012A-039	14342	0	$4,338,501.72	$4,568,287.10	-$229,785.38	5%	190
15	7/30/2003	6	NH 4701-089	12324	0	$7,787,777.77	$7,644,879.61	$142,898.16	-2%	345
16	8/12/2003	6	IM 0253-168	13344	0	$6,168,096.03	$7,355,640.06	-$1,187,544.03	19%	330
17	8/13/2003	3	BR 0402-056	12606	0	$2,590,348.59	$2,764,860.79	-$174,512.20	7%	180
18	8/20/2003	6	STP R600-198	14145	0	$427,370.80	$479,768.23	-$52,397.43	12%	30
19	8/22/2003	3	STA 340A-007	13333	0	$874,474.10	$855,773.48	$18,700.62	-2%	112
20	8/25/2003	2	NH 1603-016	12833	0	$1,834,141.75	$1,916,728.58	-$82,586.83	5%	95
21	8/29/2003	2	STA 096A-035	14450	0	$449,950.00	$479,055.75	-$29,105.75	6%	35
22	9/3/2003	2	ITS 0252-363	14399	0	$1,428,532.76	$2,925,532.91	-$1,497,000.15	105%	90
23	9/8/2003	5	NH 1601-050	12803	0	$3,278,955.35	$3,790,854.50	-$511,899.15	16%	150
24	9/16/2003	2	NH 2872-015	13553	0	$8,812,920.30	$9,374,143.02	-$561,222.72	6%	365
25	9/22/2003	6	C R600-211	14564	0	$474,800.00	$466,431.50	$8,368.50	-2%	90
26	9/29/2003	5	NH 2852-007	12794	0	$4,381,170.42	$4,227,029.35	$154,141.07	-4%	310
27	10/7/2003	2	NH 0243-065	14173	0	$292,602.00	$272,837.21	$19,764.79	-7%	30
28	10/15/2003	2	SHE 067A-023	14677	0	$389,368.21	$389,456.19	-$87.98	0%	20
29	10/27/2003	6	STU C120-007	12369	0	$20,820,015.25	$21,783,105.28	-$963,090.03	5%	960

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
30	11/5/2003	6	DEMO R600-144	13076	0	$3,606,289.56	$3,024,930.73	$581,358.83	-16%	290
31	11/10/2003	3	NH 0501-041	12711	0	$9,449,707.65	$9,228,241.54	$221,466.11	-2%	200
32	11/24/2003	6	STA R600-199	14175	0	$389,555.60	$399,279.58	-$9,723.98	2%	60
33	11/24/2003	6	C R600-210	14563	0	$429,756.40	$423,372.77	$6,383.63	-1%	100
34	11/26/2003	4	BR 0341-051	12460	0	$2,556,258.90	$2,854,993.09	-$298,734.19	12%	440
35	12/5/2003	2	STU M240-080	14463	0	$1,798,406.62	$1,940,069.79	-$141,663.17	8%	100
36	12/8/2003	5	NH 1602-090	13969	1	$14,496,678.07	$15,349,793.46	-$853,115.39	6%	550
37	12/9/2003	2	STU M240-079	14462	0	$1,762,237.94	$1,771,530.82	-$9,292.88	1%	100
38	12/11/2003	3	BR 0241-040	14164	1	$3,593,870.99	$3,632,617.70	-$38,746.71	1%	242
39	12/12/2003	4	IM 076A-005	14609	0	$228,000.00	$263,051.10	-$35,051.10	15%	50
40	12/18/2003	3	SHE R300-114	14511	0	$304,019.87	$299,292.38	$4,727.49	-2%	30
41	12/22/2003	4	C 0341-061	14704	0	$36,564.00	$30,929.50	$5,634.50	-15%	20
42	12/23/2003	5	NH 5502-043	14508	0	$997,757.69	$977,264.81	$20,492.88	-2%	50
43	12/23/2003	5	NH 5502-044	14520	0	$4,427,536.11	$4,552,944.83	-$125,408.72	3%	110
44	12/26/2003	6	IM 0761-188	14323	0	$4,592,000.00	$4,774,919.74	-$182,919.74	4%	150
45	1/5/2004	1	IM 0703-269	13166	0	$10,976,199.04	$11,178,297.00	-$202,097.96	2%	420
46	1/8/2004	2	NH 0242-039	14208	0	$4,015,672.71	$4,132,861.97	-$117,189.26	3%	65
47	1/12/2004	5	STA 2911-001	14426	0	$1,463,025.85	$1,408,946.84	$54,079.01	-4%	45
48	1/13/2004	6	STA 0062-015	14241	0	$1,586,248.25	$1,431,132.14	$155,116.11	-10%	80
49	1/13/2004	5	NH 5502-045	14774	0	$379,845.06	$434,301.94	-$54,456.88	14%	136
50	1/14/2004	6	IM 2706-032	13500	1	$15,807,428.41	$15,539,145.86	$268,282.55	-2%	480
51	1/22/2004	1	IM 0704-203	14560	0	$2,671,609.00	$2,729,792.21	-$58,183.21	2%	50
52	1/22/2004	5	STA 114-009	14775	0	$1,261,139.90	$1,321,677.73	-$60,537.83	5%	40
53	2/2/2004	4	C 0342-040	14739	0	$234,375.22	$241,107.49	-$6,732.27	3%	40
54	2/2/2004	3	STA R300-120	14638	0	$849,869.40	$794,154.61	$55,714.79	-7%	30
55	2/4/2004	6	STA 1211-059	14238	0	$2,083,604.60	$1,684,422.03	$399,182.57	-19%	70

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
56	2/9/2004	1	IM 0703-286	14587	0	$2,797,791.89	$2,880,471.75	-$82,679.86	3%	75
57	2/9/2004	6	STA 1211-058	14237	0	$1,022,091.35	$996,518.70	$25,572.65	-3%	47
58	2/10/2004	2	STA 1604-008	14146	0	$2,480,778.27	$2,681,485.29	-$200,707.02	8%	65
59	2/17/2004	1	NH 0403-035	12418	1	$15,581,590.13	$16,134,017.10	-$552,426.97	4%	250
60	2/17/2004	4	STA 0341-050	12512	0	$851,494.65	$868,353.25	-$16,858.60	2%	133
61	2/17/2004	3	MC R300-118	14743	0	$1,553,140.00	$1,842,500.00	-$289,360.00	19%	128
62	2/17/2004	4	C 001A-038	14311	0	$65,134.00	$61,353.45	$3,780.55	-6%	15
63	2/17/2004	6	STA 0853-052	14239	0	$1,269,980.46	$1,070,535.14	$199,445.32	-16%	40
64	2/19/2004	6	STA 0881-013	13359	0	$1,122,928.60	$1,039,671.26	$83,257.34	-7%	128
65	2/19/2004	3	IM 0701-164	14483	0	$7,163,679.84	$7,180,113.55	-$16,433.71	0%	140
66	2/20/2004	6	STA 0404-040	14240	0	$1,831,904.50	$1,675,597.21	$156,307.29	-9%	115
67	2/23/2004	6	STA 2854-097	14243	0	$2,131,812.90	$2,526,385.46	-$394,572.56	19%	85
68	2/26/2004	6	STA 1211-057	13957	0	$1,112,323.90	$1,039,862.29	$72,461.61	-7%	50
69	3/1/2004	3	IM 0701-157	13535	1	$7,817,860.78	$7,666,347.99	$151,512.79	-2%	199
70	3/1/2004	6	STA 391A-001	13358	1	$972,522.13	$959,694.96	$12,827.17	-1%	58
71	3/2/2004	1	C 074A-007	14573	0	$265,549.00	$255,542.08	$10,006.92	-4%	225
72	3/3/2004	5	STA 003A-001	14381	0	$860,821.65	$797,786.76	$63,034.89	-7%	30
73	3/3/2004	5	STA 0241-042	14776	0	$1,388,976.00	$1,115,480.51	$273,495.49	-20%	45
74	3/8/2004	3	STA 014A-030	14691	0	$1,762,456.25	$1,851,553.67	-$89,097.42	5%	45
75	3/9/2004	2	STA 3501-010	14806	0	$2,205,576.20	$2,360,705.42	-$155,129.22	7%	90
76	3/10/2004	1	STA 0405-030	13818	0	$4,873,435.70	$5,025,160.11	-$151,724.41	3%	110
77	3/10/2004	4	NH 0853-053	14528	0	$5,259,879.05	$5,276,851.54	-$16,972.49	0%	135
78	3/10/2004	6	STA 0831-089	14242	0	$3,218,889.89	$3,995,935.00	-$777,045.11	24%	75
79	3/12/2004	3	STA 131A-031	14700	0	$2,153,005.84	$2,180,615.64	-$27,609.80	1%	190
80	3/15/2004	1	IM 0252-359	13967	0	$6,773,273.49	$7,090,148.50	-$316,875.01	5%	448
81	3/16/2004	3	STA 009A-023	14690	0	$1,543,440.90	$1,548,260.39	-$4,819.49	0%	60
82	3/24/2004	3	SHE R300-113	14510	0	$399,310.00	$395,059.68	$4,250.32	-1%	30
83	3/30/2004	1	STA C470-026	14657	1	$5,191,685.47	$5,356,361.34	-$164,675.87	3%	169
84	3/31/2004	2	NH 2872-016	14213	0	$3,660,904.93	$4,121,726.82	-$460,821.89	13%	145
85	4/1/2004	3	C R300-116	14702	0	$534,833.50	$561,956.66	-$27,123.16	5%	76
86	4/5/2004	3	MC R300-119	14744	0	$420,475.00	$347,224.34	$73,250.66	-17%	98
87	4/5/2004	6	NH 2854-072	12022	0	$2,529,827.73	$2,888,087.14	-$358,259.41	14%	120

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
88	4/5/2004	6	STA R600-189	13857	0	$913,382.85	$906,145.31	$7,237.54	-1%	120
89	4/6/2004	2	STU M240-081	14464	0	$10,221,497.65	$11,979,564.39	-$1,758,066.74	17%	300
90	4/6/2004	4	SHE R400-164	14798	0	$649,049.49	$634,070.89	$14,978.60	-2%	60
91	4/8/2004	2	NH 0504-046	14209	0	$2,300,381.95	$2,688,545.01	-$388,163.06	17%	60
92	4/8/2004	3	STA 133A-028	14011	0	$2,698,614.40	$2,581,279.44	$117,334.96	-4%	65
93	4/12/2004	2	SHE M086-041	14714	0	$459,745.75	$498,288.15	-$38,542.40	8%	50
94	4/12/2004	3	STA 0063-016	14692	0	$1,526,492.50	$1,352,248.30	$174,244.20	-11%	45
95	4/12/2004	2	C R200-126	14733	0	$172,250.75	$189,828.91	-$17,578.16	10%	20
96	4/12/2004	6	NH R600-220	14736	0	$308,436.12	$301,296.44	$7,139.68	-2%	140
97	4/16/2004	4	NH 2873-134	14706	0	$4,582,362.55	$5,201,478.88	-$619,116.33	14%	125
98	4/20/2004	4	STA 0853-051	14149	0	$1,773,238.40	$1,580,347.63	$192,890.77	-11%	80
99	4/21/2004	4	STA 2571-008	14709	0	$1,138,186.32	$1,117,489.73	$20,696.59	-2%	60
100	4/21/2004	4	STA 1191-020	14400	0	$297,950.00	$250,921.40	$47,028.60	-16%	37
101	4/26/2004	5	SHE 1601-052	14554	0	$278,273.00	$252,008.70	$26,264.30	-9%	40
102	4/27/2004	1	ITS SW00-264	14606	0	$8,981,182.46	$11,258,151.73	-$2,276,969.27	25%	375
103	4/29/2004	2	NH 0505-039	14820	0	$2,093,057.95	$2,499,985.14	-$406,927.19	19%	50
104	4/29/2004	3	NH 0502-053	13472	1	$3,840,371.95	$3,925,127.92	-$84,755.97	2%	120
105	5/3/2004	4	NH 2873-123	14150	1	$1,466,997.31	$1,606,546.31	-$139,549.00	10%	50
106	5/3/2004	6	STU M055-016	14135	0	$1,328,899.94	$1,393,849.39	-$64,949.45	5%	75
107	5/3/2004	4	IM 0253-188	14817	0	$3,271,336.16	$3,580,231.84	-$308,895.68	9%	120
108	5/3/2004	5	NH 2852-010	12797	0	$1,342,079.19	$1,269,234.91	$72,844.28	-5%	379
109	5/4/2004	1	NH 0741-015	14826	0	$876,645.35	$882,468.18	-$5,822.83	1%	22
110	5/5/2004	1	STA 0091-021	14282	0	$886,074.14	$1,029,765.53	-$143,691.39	16%	75
111	5/6/2004	1	IM 0252-360	13968	0	$3,742,443.82	$3,941,710.41	-$199,266.59	5%	240
112	5/7/2004	3	STA M555-023	14759	0	$383,745.49	$411,567.85	-$27,822.36	7%	35
113	5/11/2004	4	SHE 052A-020	14266	0	$2,495,000.00	$2,622,729.44	-$127,729.44	5%	105
114	5/17/2004	1	BR 0362-028	14824	0	$65,954.00	$66,325.00	-$371.00	1%	10
115	5/17/2004	5	NH 1602-101	14828	0	$434,048.22	$409,722.06	$24,326.16	-6%	45
116	5/24/2004	3	STA 006A-035	13594	0	$3,131,076.40	$3,047,133.70	$83,942.70	-3%	235
117	5/24/2004	1	STA 0092-017	14465	0	$455,674.34	$462,875.31	-$7,200.97	2%	49
118	5/27/2004	2	STA 165A-010	14212	0	$2,557,928.70	$2,512,939.58	$44,989.12	-2%	80

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
119	6/1/2004	4	STA R400-170	14833	0	$737,737.00	$662,120.19	$75,616.81	-10%	25
120	6/7/2004	3	BR 0092-018	14716	0	$391,282.25	$339,123.79	$52,158.46	-13%	90
121	6/10/2004	3	NH 0821-064	13885	0	$3,172,912.70	$3,504,229.32	-$331,316.62	10%	332
122	6/15/2004	4	STA R400-169	14832	0	$1,047,777.00	$845,524.74	$202,252.26	-19%	9
123	6/18/2004	1	NH 0852-089	13898	1	$9,822,222.22	$9,375,824.02	$446,398.20	-5%	180
124	6/18/2004	4	NH 0361-076	14708	0	$2,657,256.14	$2,311,168.22	$346,087.92	-13%	66
125	6/22/2004	6	AQC R600-215	14676	0	$414,822.63	$396,668.81	$18,153.82	-4%	80
126	6/23/2004	4	BR 0063-013	11723	0	$2,069,143.37	$2,041,830.17	$27,313.20	-1%	240
127	6/23/2004	4	STA R400-146	14372	0	$570,579.19	$579,053.69	-$8,474.50	1%	100
128	6/24/2004	3	IM 0702-239	14021	0	$802,553.00	$800,321.35	$2,231.65	0%	155
129	6/25/2004	4	STA R400-168	14805	0	$113,692.50	$171,086.69	-$57,394.19	50%	45
130	6/28/2004	4	STA 0343-023	14795	0	$3,309,755.45	$3,486,399.42	-$176,643.97	5%	100
131	6/30/2004	6	CC R600-225	14781	0	$461,759.40	$520,232.61	-$58,473.21	13%	60
132	7/1/2004	4	IM 0761-185	13977	0	$3,183,834.35	$3,194,125.05	-$10,290.70	0%	56
133	7/6/2004	3	STA 0131-041	12966	0	$2,675,014.35	$2,960,493.46	-$285,479.11	11%	150
134	7/8/2004	1	STA 086A-040	14549	0	$2,716,510.75	$2,925,163.93	-$208,653.18	8%	100
135	7/9/2004	6	IM 0253-186	14613	1	$4,034,586.35	$4,415,380.72	-$380,794.37	9%	165
136	7/9/2004	2	SHE 096A-036	14661	1	$903,772.20	$1,058,520.25	-$154,748.05	17%	120
137	7/16/2004	4	IM 0761-183	13568	0	$13,055,555.00	$13,411,147.01	-$355,592.01	3%	245
138	7/29/2004	1	BR 0061-073	13961	0	$2,080,457.61	$2,402,076.99	-$321,619.38	15%	50
139	7/30/2004	1	SHE 105A-011	14513	0	$156,568.50	$180,503.13	-$23,934.63	15%	25
140	8/3/2004	1	SHE 0091-023	14572	0	$179,288.23	$183,243.28	-$3,955.05	2%	249
141	8/3/2004	2	STA R200-128	14895	0	$923,043.00	$1,000,941.80	-$77,898.80	8%	25
142	8/9/2004	1	SHE 0253-184	14512	0	$859,202.05	$859,862.43	-$660.38	0%	60
143	8/11/2004	1	IM 0702-250	14980	0	$876,433.40	$961,195.39	-$84,761.99	10%	92
144	8/18/2004	6	IMD 0252-364	14482	0	$21,876,939.55	$26,087,033.10	-$4,210,093.55	19%	1005
145	8/25/2004	3	IM 0701-168	14948	0	$1,349,754.00	$1,255,562.51	$94,191.49	-7%	92
146	8/25/2004	1	STA 2854-107	14954	0	$160,875.67	$175,895.77	-$15,020.10	9%	81
147	8/26/2004	2	NH 0243-068	14822	0	$5,181,045.10	$5,553,313.88	-$372,268.78	7%	230
148	8/27/2004	1	BR 0243-063	13496	0	$1,033,650.00	$1,140,851.65	-$107,201.65	10%	45
149	8/30/2004	1	STA 0091-016	13216	1	$5,191,229.81	$5,559,261.61	-$368,031.80	7%	170

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
150	8/31/2004	6	SHE 4701-105	14579	0	$965,714.50	$920,071.55	$45,642.95	-5%	120
151	9/20/2004	5	STA 149A-021	14823	0	$722,496.00	$721,633.86	$862.14	0%	30
152	9/27/2004	3	SHE 0403-049	14936	0	$148,321.00	$130,660.60	$17,660.40	-12%	45
153	10/6/2004	4	C 060A-006	14077	0	$1,265,770.60	$1,363,326.07	-$97,555.47	8%	130
154	10/8/2004	5	NH 1602-100	14671	0	$6,265,091.20	$6,740,549.26	-$475,458.06	8%	195
155	10/12/2004	3	SHE 5502-047	14939	0	$136,238.11	$137,236.25	-$998.14	1%	20
156	10/18/2004	2	IM 0251-167	14552	0	$4,459,369.25	$4,739,563.30	-$280,194.05	6%	200
157	10/21/2004	4	BR 0361-064	12811	0	$712,644.60	$739,223.29	-$26,578.69	4%	85
158	10/25/2004	1	C 0702-253	15077	0	$221,705.00	$228,425.41	-$6,720.41	3%	40
159	10/27/2004	1	STA 0703-290	14982	0	$476,475.00	$513,520.84	-$37,045.84	8%	25
160	10/28/2004	2	SHE 105A-010	12862	0	$493,166.50	$662,870.38	-$169,703.88	34%	60
161	11/10/2004	5	C 1601-054	15068	0	$1,349,521.15	$2,026,767.46	-$677,246.31	50%	50
162	11/22/2004	6	IM 0253-173	13622	0	$13,199,280.10	$13,720,658.94	-$521,378.84	4%	422
163	11/22/2004	1	IM 0705-074	15007	0	$2,296,134.01	$2,371,044.36	-$74,910.35	3%	40
164	11/22/2004	4	NH 2873-137	14814	0	$478,213.90	$499,625.38	-$21,411.48	4%	45
165	11/22/2004	6	C R600-232	14889	0	$497,402.90	$503,018.30	-$5,615.40	1%	90
166	11/30/2004	3	ER 0702-255	15164	0	$681,775.00	$889,638.76	-$207,863.76	30%	60
167	12/14/2004	6	STA 095A-006	14626	0	$753,539.95	$717,155.68	$36,384.27	-5%	60
168	12/17/2004	6	BR 0021-024	12322	0	$6,326,718.25	$6,726,418.70	-$399,700.45	6%	300
169	12/17/2004	1	STA 0243-069	15019	0	$1,416,858.00	$1,462,409.03	-$45,551.03	3%	60
170	12/29/2004	6	NH 0021-026	14616	0	$692,517.94	$763,872.80	-$71,354.86	10%	50
171	12/29/2004	6	STA 0831-093	14624	0	$1,267,374.26	$1,225,597.78	$41,776.48	-3%	50
172	12/29/2004	5	STA 145A-035	14827	0	$318,677.50	$278,041.50	$40,636.00	-13%	20
173	12/29/2004	1	NH 0831-095	14992	0	$324,016.80	$336,360.03	-$12,343.23	4%	50
174	1/3/2005	6	STA 0073-006	14619	0	$1,546,116.80	$1,590,494.69	-$44,377.89	3%	50
175	1/3/2005	6	STA 391A-002	14618	0	$929,415.50	$824,945.06	$104,470.44	-11%	65
176	1/3/2005	6	STA 095A-007	14627	0	$1,071,133.05	$1,110,689.15	-$39,556.10	4%	80
177	1/5/2005	6	NH 0853-054	14612	0	$2,017,379.82	$1,923,692.24	$93,687.58	-5%	50
178	1/6/2005	6	STA 1281-009	14610	0	$1,270,374.57	$1,096,217.92	$174,156.65	-14%	70
179	1/7/2005	6	NH 0404-041	14625	0	$869,601.10	$858,828.69	$10,772.41	-1%	45
180	1/11/2005	1	STA R100-106	14953	0	$115,881.00	$104,780.30	$11,100.70	-10%	17
181	1/12/2005	1	STA 072A-028	13855	0	$2,352,913.40	$2,330,984.04	$21,929.36	-1%	80

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
182	1/12/2005	1	NH 2854-104	14850	0	$2,163,997.50	$2,201,320.15	-$37,322.65	2%	32
183	1/12/2005	5	NH 0502-056	14851	0	$1,887,632.20	$1,905,478.23	-$17,846.03	1%	60
184	1/12/2005	5	NH 0502-055	14687	0	$4,147,132.30	$3,902,957.60	$244,174.70	-6%	246
185	1/14/2005	6	MC R600-226	14831	0	$889,723.60	$685,838.03	$203,885.57	-23%	113
186	1/18/2005	5	STA 145A-036	14914	0	$3,737,519.60	$3,842,278.11	-$104,758.51	3%	100
187	1/20/2005	1	IM 0252-375	14993	0	$112,343.16	$64,636.92	$47,706.24	-42%	25
188	1/26/2005	5	NH 1601-055	15075	1	$589,127.93	$558,921.95	$30,205.98	-5%	85
189	1/26/2005	3	STA R300-124	15034	0	$1,158,513.82	$1,055,942.07	$102,571.75	-9%	40
190	1/27/2005	1	IM 0703-287	14849	0	$4,972,207.50	$5,325,345.25	-$353,137.75	7%	80
191	1/31/2005	5	BR 151A-007	13923	1	$3,170,919.62	$3,120,776.48	$50,143.14	-2%	180
192	2/7/2005	4	STA 0343-022	14529	0	$5,076,780.72	$5,175,788.62	-$99,007.90	2%	100
193	2/8/2005	4	STA 0712-012	14712	0	$5,394,890.70	$5,725,630.92	-$330,740.22	6%	100
194	2/14/2005	6	NH 0852-093	14611	0	$781,716.56	$782,765.60	-$1,049.04	0%	60
195	2/14/2005	6	STA 008A-005	14621	0	$387,890.95	$365,237.55	$22,653.40	-6%	30
196	2/14/2005	6	NH 0881-018	14632	0	$2,555,806.67	$2,492,592.20	$63,214.47	-2%	112
197	2/15/2005	1	STA R100-107	14951	0	$1,243,328.10	$1,575,032.42	-$331,704.32	27%	214
198	2/23/2005	3	NH 0502-057	15035	0	$1,023,605.46	$1,044,705.52	-$21,100.06	2%	25
199	2/25/2005	3	NH 0821-073	14974	0	$129,752.50	$159,059.00	-$29,306.50	23%	62
200	2/25/2005	6	SHE R600-240	15074	0	$449,882.50	$437,579.18	$12,303.32	-3%	100
201	2/25/2005	2	NH 0504-048	15162	1	$3,943,515.25	$4,045,197.45	-$101,682.20	3%	89
202	2/25/2005	1	NH 0404-039	13506	0	$2,856,297.60	$3,166,067.84	-$309,770.24	11%	120
203	2/25/2005	4	STA 0142-042	14698	0	$5,840,671.25	$6,108,894.19	-$268,222.94	5%	90
204	3/1/2005	4	STA 0142-043	14710	0	$5,045,469.85	$5,065,351.31	-$19,881.46	0%	90
205	3/2/2005	2	STA 0711-015	14787	0	$1,888,843.16	$2,033,045.51	-$144,202.35	8%	45
206	3/3/2005	4	STA 0361-078	15175	0	$217,712.00	$196,571.00	$21,141.00	-10%	11
207	3/3/2005	2	IM 0251-168	15039	1	$3,699,713.66	$3,550,115.92	$149,597.74	-4%	85
208	3/4/2005	2	STA 0961-011	14211	0	$1,210,936.15	$1,245,582.93	-$34,646.78	3%	60
209	3/7/2005	6	STA 0831-092	14623	0	$1,746,398.10	$1,555,097.42	$191,300.68	-11%	60
210	3/10/2005	3	STA 141A-028	15033	0	$1,059,492.20	$1,096,634.91	-$37,142.71	4%	35
211	3/10/2005	1	IM 0704-205	15053	0	$955,736.50	$1,140,979.35	-$185,242.85	19%	75
212	3/10/2005	3	STA 0131-047	15027	0	$2,815,815.20	$3,156,053.88	-$340,238.68	12%	184

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
213	3/11/2005	3	NH 0402-066	15030	1	$3,321,770.28	$3,516,278.06	-$194,507.78	6%	80
214	3/15/2005	1	IM 0702-246	14819	0	$845,714.28	$845,926.69	-$212.41	0%	65
215	3/15/2005	3	BR 131A-027	13605	0	$1,567,370.34	$1,630,724.69	-$63,354.35	4%	178
216	3/15/2005	3	BR 014A-014	13201	0	$1,136,871.39	$1,101,940.75	$34,930.64	-3%	90
217	3/15/2005	2	STA 1151-017	15017	0	$2,370,229.77	$2,456,942.41	-$86,712.64	4%	214
218	3/18/2005	1	IM 0252-374	14950	0	$2,712,022.25	$2,491,310.04	$220,712.21	-8%	90
219	3/22/2005	6	NH 2854-101	14636	0	$3,305,627.05	$3,162,369.89	$143,257.16	-4%	120
220	3/25/2005	3	SHE 0701-167	14938	0	$494,704.00	$442,272.02	$52,431.98	-11%	35
221	3/25/2005	3	IM 0701-171	15032	0	$5,132,660.53	$5,088,927.13	$43,733.40	-1%	178
222	3/28/2005	2	STA 105A-012	15157	0	$2,557,832.76	$2,482,944.95	$74,887.81	-3%	100
223	3/28/2005	6	C R600-239	15060	0	$1,129,802.45	$1,104,801.53	$25,000.92	-2%	40
224	3/29/2005	2	NH 0504-047	15158	0	$3,184,433.35	$3,783,537.66	-$599,104.31	19%	60
225	3/29/2005	4	C 0253-183	14438	0	$57,817.00	$72,419.00	-$14,602.00	25%	15
226	4/8/2005	3	NH 402-067	15031	0	$1,082,725.42	$1,048,794.75	$33,930.67	-3%	112
227	4/8/2005	6	NH 2873-131	14630	0	$2,223,419.03	$2,115,351.63	$108,067.40	-5%	115
228	4/11/2005	6	STA 1281-010	15103	0	$289,752.18	$253,774.13	$35,978.05	-12%	100
229	4/11/2005	4	SHE R400-172	14923	0	$106,704.75	$158,937.55	-$52,232.80	49%	20
230	4/11/2005	4	SHE R400-180	15009	0	$778,803.30	$902,451.65	-$123,648.35	16%	64
231	4/12/2005	5	HB 140A-003	15135	0	$4,522,513.30	$5,083,592.30	-$561,079.00	12%	110
232	4/14/2005	4	STA 0361-075	14663	0	$4,668,074.45	$5,281,760.54	-$613,686.09	13%	70
233	4/14/2005	4	STA 0661-007	15200	0	$304,540.13	$300,455.96	$4,084.17	-1%	15
234	4/22/2005	4	NH 0853-059	15008	0	$339,099.15	$349,700.72	-$10,601.57	3%	40
235	4/25/2005	3	CC 0702-249	14979	0	$2,912,372.55	$2,798,091.43	$114,281.12	-4%	169
236	4/28/2005	5	NH 1603-021	14507	0	$2,342,259.14	$2,345,341.82	-$3,082.68	0%	35
237	5/2/2005	4	STA 1191-022	15076	0	$255,000.00	$241,154.18	$13,845.82	-5%	35
238	5/3/2005	5	NH 1602-091	13970	0	$11,334,604.05	$11,428,456.55	-$93,852.50	1%	180
239	5/4/2005	4	BR 0062-013	12810	0	$1,577,525.55	$1,564,667.69	$12,857.86	-1%	100
240	5/4/2005	6	IM 2706-034	14234	1	$6,106,038.53	$6,450,241.57	-$344,203.04	6%	215
241	5/5/2005	4	SHE R400-184	15180	0	$193,500.00	$201,688.00	-$8,188.00	4%	40
242	5/6/2005	3	IM 0702-248	14852	0	$1,637,804.05	$1,629,347.71	$8,456.34	-1%	196
243	5/10/2005	5	NH 1602-103	14978	1	$3,217,511.10	$3,470,421.50	-$252,910.40	8%	141

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
244	5/10/2005	2	IM 0252-330	13003	0	$11,874,901.50	$13,944,561.62	-$2,069,660.12	17%	390
245	5/11/2005	6	IM 0253-180	14322	0	$565,119.90	$589,080.58	-$23,960.68	4%	56
246	5/12/2005	6	NH 4701-106	15205	0	$1,789,459.80	$2,131,141.41	-$341,681.61	19%	110
247	5/17/2005	2	NH 0243-072	15156	0	$1,913,643.85	$2,057,855.47	-$144,211.62	8%	140
248	5/17/2005	3	STA 0241-043	14935	0	$4,724,744.98	$4,572,897.70	$151,847.28	-3%	513
249	5/17/2005	3	IM 0701-169	15028	0	$1,797,383.69	$1,866,548.15	-$69,164.46	4%	143
250	5/20/2005	1	HB 0405-024	12490	0	$5,173,115.36	$5,356,752.50	-$183,637.14	4%	90
251	5/24/2005	4	STA 0142-044	15199	0	$48,230.00	$52,307.20	-$4,077.20	8%	10
252	5/24/2005	4	STA 0341-063	14783	0	$427,905.00	$351,388.70	$76,516.30	-18%	254
253	5/26/2005	6	STE C010-057	12560	0	$3,679,885.56	$3,895,932.60	-$216,047.04	6%	440
254	5/27/2005	3	HB 0821-075	15155	0	$13,966,285.67	$15,118,258.28	-$1,151,972.61	8%	917
255	6/1/2005	4	STA 0341-065	15225	0	$587,654.00	$512,549.05	$75,104.95	-13%	25
256	6/1/2005	4	BR 0853-050	14096	0	$1,009,760.15	$909,463.84	$100,296.31	-10%	120
257	6/9/2005	2	NH R200-131	15271	0	$872,770.00	$856,405.39	$16,364.61	-2%	45
258	6/21/2005	4	STA 059A-029	15203	0	$828,332.40	$733,924.12	$94,408.28	-11%	19
259	6/21/2005	4	STA 0142-045	15204	0	$496,885.90	$451,566.87	$45,319.03	-9%	33
260	6/21/2005	6	STA 0021-029	15080	0	$322,191.60	$303,530.60	$18,661.00	-6%	56
261	6/24/2005	1	ER 0061-077	15404	0	$760,000.00	$2,181,235.88	-$1,421,235.88	187%	25
262	6/29/2005	6	NH 2873-129	14628	0	$1,049,682.22	$979,908.48	$69,773.74	-7%	50
263	6/30/2005	2	NH 0242-043	15072	0	$520,410.00	$517,065.44	$3,344.56	-1%	45
264	7/7/2005	6	STA 0073-007	14620	0	$1,637,466.38	$1,323,150.38	$314,316.00	-19%	65
265	7/25/2005	4	IM 0761-190	14838	0	$8,279,513.82	$8,423,946.92	-$144,433.10	2%	200
266	7/27/2005	3	BR 139A-028	15110	0	$190,970.00	$173,346.10	$17,623.90	-9%	25
267	7/27/2005	6	STU M055-017	14136	0	$612,591.54	$567,457.11	$45,134.43	-7%	100
268	8/11/2005	6	STU M055-014	13697	1	$3,475,008.70	$3,261,880.77	$213,127.93	-6%	120
269	8/15/2005	1	STA 0831-098	15161	0	$442,405.30	$430,952.89	$11,452.41	-3%	40
270	8/19/2005	3	STA 340A-011	15070	1	$674,019.75	$669,593.49	$4,426.26	-1%	45
271	8/22/2005	4	CC R400-156	14683	0	$262,263.20	$262,620.00	-$356.80	0%	40
272	8/23/2005	6	C R600-246	15206	0	$928,517.90	$828,023.85	$100,494.05	-11%	65

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
273	8/23/2005	3	IM 0701-162	14315	1	$5,774,003.75	$5,960,279.83	-$186,276.08	3%	170
274	9/1/2005	6	STA R600-244	15168	0	$1,002,439.05	$1,047,868.61	-$45,429.56	5%	20
275	9/2/2005	1	IM 0702-242	14527	0	$1,130,569.00	$1,213,527.31	-$82,958.31	7%	45
276	9/7/2005	6	SHE 1211-063	15169	0	$538,822.00	$549,344.89	-$10,522.89	2%	45
277	9/7/2005	1	SHE 0253-195	15223	0	$582,604.67	$621,524.53	-$38,919.86	7%	35
278	9/8/2005	1	HB 0852-097	15139	0	$5,847,854.42	$6,090,354.00	-$242,499.58	4%	240
279	9/14/2005	6	SHE 0361-080	15368	0	$525,045.00	$533,041.53	-$7,996.53	2%	140
280	9/15/2005	5	PLH 145A-038	15374	0	$218,355.00	$370,626.34	-$152,271.34	70%	182
281	9/22/2005	3	NH 0502-058	15064	0	$527,240.00	$518,851.86	$8,388.14	-2%	217
282	10/3/2005	3	SHE 114A-013	15289	0	$407,512.36	$518,710.86	-$111,198.50	27%	214
283	10/3/2005	1	ER 0703-299	15493	0	$578,232.00	$519,276.00	$58,956.00	-10%	40
284	10/4/2005	5	NH 5502-046	14924	0	$392,867.00	$404,779.45	-$11,912.45	3%	238
285	10/4/2005	3	STR 131A-029	14214	0	$5,628,548.15	$6,300,237.57	-$671,689.42	12%	120
286	10/19/2005	2	BR 0251-162	14081	0	$4,182,533.00	$3,841,913.13	$340,619.87	-8%	175
287	11/7/2005	1	IM 0703-297	15369	0	$986,750.00	$1,032,626.18	-$45,876.18	5%	128
288	11/22/2005	6	ER R600-276	15566	1	$71,745.00	$66,100.09	$5,644.91	-8%	14
289	11/23/2005	4	STA 0072-012	14303	0	$3,803,294.94	$4,182,470.61	-$379,175.67	10%	120
290	11/28/2005	6	MC R600-248	15231	0	$342,624.30	$295,764.09	$46,860.21	-14%	100
291	11/28/2005	5	NH 4911-003	14284	0	$70,296.44	$69,220.84	$1,075.60	-2%	15
292	11/28/2005	1	BR 0362-027	14584	0	$2,059,396.33	$2,127,353.00	-$67,956.67	3%	90
293	12/9/2005	5	NH 5502-049	15051	0	$448,448.00	$412,559.40	$35,888.60	-8%	40
294	12/14/2005	3	FLH 065A-018	13960	0	$3,109,987.90	$3,011,762.01	$98,225.89	-3%	60
295	12/19/2005	5	STA 141A-029	15150	0	$2,319,776.85	$2,662,885.83	-$343,108.98	15%	141
296	12/23/2005	5	NH 2852-015	15229	0	$368,801.18	$363,785.02	$5,016.16	-1%	15
297	12/27/2005	3	NH 0501-050	15433	0	$2,933,333.55	$3,115,281.81	-$181,948.26	6%	60
298	12/27/2005	3	STA 134A-010	15066	0	$2,959,662.00	$2,904,619.91	$55,042.09	-2%	225
299	12/27/2005	4	IM C060-030	13224	0	$4,772,309.08	$5,301,932.35	-$529,623.27	11%	372
300	12/27/2005	6	AQC M810-007	14855	0	$444,714.50	$484,250.95	-$39,536.45	9%	85
301	12/28/2005	3	STA 0131-048	15434	0	$1,236,500.00	$1,227,222.42	$9,277.58	-1%	35
302	1/5/2006	3	C 0702-258	15611	0	$53,000.00	$50,712.44	$2,287.56	-4%	30

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
303	1/11/2006	1	IM 0705-076	15406	0	$2,380,980.05	$2,463,132.20	-$82,152.15	3%	40
304	1/17/2006	1	SHE 0091-025	14981	0	$174,645.00	$150,298.58	$24,346.42	-14%	64
305	1/18/2006	4	NH 0342-042	15508	0	$1,585,500.00	$1,583,521.12	$1,978.88	0%	35
306	1/18/2006	4	STA 0361-081	15527	0	$141,591.12	$128,659.90	$12,931.22	-9%	30
307	1/20/2006	5	NH 1602-096	14478	0	$4,354,793.50	$4,580,263.07	-$225,469.57	5%	100
308	1/20/2006	4	NH 0341-064	15141	0	$2,577,365.95	$2,584,761.50	-$7,395.55	0.3%	85
309	1/20/2006	1	STA 105A-013	15272	0	$1,259,439.92	$1,264,010.89	-$4,570.97	0.4%	50
310	1/24/2006	5	NH 5502-052	15137	0	$6,249,303.40	$6,279,337.69	-$30,034.29	0.5%	220
311	1/24/2006	2	STA 0851-007	15349	0	$2,040,422.08	$1,963,451.33	$76,970.75	-4%	130
312	1/25/2006	3	SHE 0821-074	15061	0	$425,058.20	$470,717.78	-$45,659.58	11%	129
313	1/31/2006	6	IM 0704-206	15174	0	$2,567,642.00	$2,465,000.00	$102,642.00	-4%	197
314	2/3/2006	4	STA 3852-010	15142	0	$5,798,560.50	$6,125,854.02	-$327,293.52	6%	110
315	2/6/2006	4	STA 0343-025	15144	0	$4,552,264.00	$4,807,612.41	-$255,348.41	6%	110
316	2/6/2006	4	STA 052A-024	15428	0	$2,467,100.00	$2,520,497.78	-$53,397.78	2%	60
317	2/8/2006	2	SHE 0504-049	15391	0	$355,920.50	$361,098.16	-$5,177.66	1%	35
318	2/9/2006	4	STA 1131-005	15510	0	$674,674.00	$603,527.91	$71,146.09	-11%	25
319	2/14/2006	1	NH 2854-106	14942	0	$8,048,977.96	$10,305,129.91	-$2,256,151.95	28%	239
320	2/17/2006	1	IM 0703-295	15290	0	$4,062,848.89	$4,845,222.37	-$782,373.48	19%	84
321	2/17/2006	1	SHE 2854-112	15543	0	$355,247.78	$341,733.68	$13,514.10	-4%	235
322	2/21/2006	5	STA 172A-015	14863	0	$2,132,316.90	$2,209,951.51	-$77,634.61	4%	196
323	2/22/2006	1	IM 0702-257	15195	0	$3,819,931.00	$3,825,031.15	-$5,100.15	0.1%	285
324	2/23/2006	1	IM 0703-293	15209	0	$1,692,903.89	$1,730,256.24	-$37,352.35	2%	180
325	2/24/2006	2	IM 0252-382	15517	0	$5,198,924.79	$5,265,159.19	-$66,234.40	1%	100
326	3/13/2006	3	SHE M910-004	15438	0	$443,623.75	$485,459.00	-$41,835.25	9%	136
327	3/13/2006	4	SHE R400-183	15154	0	$285,111.25	$257,749.75	$27,361.50	-10%	45
328	3/13/2006	2	IM 0252-378	15160	0	$4,933,605.85	$5,281,390.75	-$347,784.90	7%	75
329	3/14/2006	2	BR 069A-019	14087	0	$986,717.70	$1,070,302.37	-$83,584.67	8%	80
330	3/16/2006	6	NH 0021-025	14615	0	$1,817,381.45	$1,811,323.65	$6,057.80	0%	70
331	3/20/2006	6	IM 076A-006	14633	0	$3,260,892.51	$2,965,828.02	$295,064.49	-9%	70
332	3/20/2006	6	IM 0253-187	14614	0	$3,176,939.60	$3,219,994.34	-$43,054.74	1%	89
333	3/20/2006	6	SHE 2854-111	15489	0	$80,122.17	$94,742.42	-$14,620.25	18%	60
334	3/22/2006	3	IM 0701-179	15320	0	$5,542,648.70	$5,312,294.24	$230,354.46	-4%	204
335	3/22/2006	2	BR 012A-041	15217	0	$596,446.00	$596,130.58	$315.42	0%	80
336	3/22/2006	2	SHE 0243-071	15148	0	$1,395,084.77	$1,524,379.43	-$129,294.66	9%	100

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
337	3/22/2006	6	AQC R600-241	15104	0	$122,972.00	$109,498.80	$13,473.20	-11%	40
338	3/22/2006	1	STA 0091-022	14347	0	$2,530,719.40	$2,555,997.03	-$25,277.63	1%	158
339	3/27/2006	1	SHE 0911-004	15545	0	$392,973.00	$386,416.73	$6,556.27	-2%	133
340	3/28/2006	3	IM 0702-252	15067	0	$4,083,618.20	$4,030,444.13	$53,174.07	-1%	180
341	3/28/2006	1	STA 086A-043	15319	0	$753,599.00	$813,414.71	-$59,815.71	8%	65
342	3/28/2006	3	NH 0821-076	15321	0	$2,250,763.00	$2,236,732.12	$14,030.88	-1%	197
343	3/28/2006	6	NH 1211-066	15560	0	$871,333.63	$706,102.19	$165,231.44	-19%	100
344	3/28/2006	6	NH 0021-027	14617	0	$1,721,275.30	$1,732,640.00	-$11,364.70	1%	50
345	3/28/2006	4	STA 0853-063	15526	0	$97,243.28	$97,537.58	-$294.30	0%	25
346	3/29/2006	6	IM R600-224	14777	1	$6,601,236.02	$6,893,480.99	-$292,244.97	4%	300
347	3/30/2006	6	NH 093A-005	15358	0	$1,204,160.88	$1,084,567.43	$119,593.45	-10%	35
348	4/7/2006	6	R600-247	15207	0	$916,060.80	$956,305.38	-$40,244.58	4%	100
349	4/7/2006	2	SHE 069A-020	15392	0	$249,400.90	$248,218.51	$1,182.39	0%	40
350	4/7/2006	2	SHE 0451-008	15567	0	$203,119.10	$214,973.09	-$11,853.99	6%	30
351	4/10/2006	1	STA 0831-100	15498	0	$396,235.00	$395,073.58	$1,161.42	0%	185
352	4/10/2006	1	IM 0252-381	15429	0	$2,790,697.45	$2,474,365.91	$316,331.54	-11%	55
353	4/11/2006	4	STA 157A-009	15194	0	$361,992.00	$565,235.74	-$203,243.74	56%	25
354	4/11/2006	2	IM 0251-172	15562	0	$5,730,737.98	$6,015,220.47	-$284,482.49	5%	75
355	4/20/2006	6	NH 030A-024	15359	0	$1,726,368.40	$1,661,782.77	$64,585.63	-4%	60
356	4/21/2006	2	NH R200-140	15584	0	$818,472.25	$845,215.66	-$26,743.41	3%	45
357	4/21/2006	4	SHE 2873-143	15607	0	$219,773.00	$209,207.88	$10,565.12	-5%	45
358	4/24/2006	4	STA 0343-028	15525	0	$106,620.00	$102,030.47	$4,589.53	-4%	25
359	4/25/2006	4	STA 0142-046	15261	0	$3,174,436.50	$3,065,487.30	$108,949.20	-3%	50
360	4/25/2006	6	NH 088A-023	15360	0	$869,775.80	$803,452.16	$66,323.64	-8%	65
361	4/26/2006	6	STA 053A-001	14635	0	$1,098,540.40	$1,030,249.00	$68,291.40	-6%	70
362	5/2/2006	6	SHO M145-006	14416	1	$3,921,892.87	$3,955,890.90	-$33,998.03	1%	363
363	5/4/2006	5	STA-145A-037	15201	0	$11,405,683.50	$12,430,114.22	-$1,024,430.72	9%	250
364	5/4/2006	4	SHE 052A-026	15609	0	$73,752.81	$64,859.07	$8,893.74	-12%	15
365	5/25/2006	4	STA 0072-016	15515	0	$4,055,794.53	$4,046,390.40	$9,404.13	0%	60
366	5/30/2006	3	BR 0132-016	15106	0	$1,283,480.13	$1,274,378.18	$9,101.95	-1%	413
367	6/1/2006	4	NH 0341-067	15507	0	$548,670.08	$535,006.15	$13,663.93	-2%	25
368	6/13/2006	4	SHE 0342-045	15590	0	$285,800.00	$298,122.39	-$12,322.39	4%	20
369	6/14/2006	2	NH 1604-009	15159	0	$5,877,051.15	$7,355,012.90	-$1,477,961.75	25%	118

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
370	6/20/2006	6	NH 0062-021	15365	0	$4,123,078.13	$3,941,359.51	$181,718.62	-4%	100
371	6/22/2006	2	NH 2871-030	13289	0	$17,483,249.34	$18,254,957.73	-$771,708.39	4%	412
372	6/26/2006	6	CC R600-281	15663	0	$498,765.43	$470,007.03	$28,758.40	-6%	50
373	6/27/2006	4	IM 0762-043	14986	0	$12,054,086.35	$12,767,531.47	-$713,445.12	6%	180
374	6/27/2006	3	STA 0131-044	13487	0	$5,167,146.92	$5,430,230.97	-$263,084.05	5%	120
375	6/28/2006	2	C 0831-103	15617	0	$456,066.97	$497,000.40	-$40,933.43	9%	50
376	6/28/2006	6	NH 0062-022	15591	0	$362,927.25	$356,616.20	$6,311.05	-2%	45
377	6/29/2006	3	BR 149A-022	15107	0	$1,373,363.18	$1,408,283.69	-$34,920.51	3%	457
378	7/24/2006	2	BR 0504-043	14086	0	$1,286,055.50	$1,403,782.28	-$117,726.78	9%	90
379	7/31/2006	6	NH 026A-003	15363	0	$1,148,761.70	$1,032,560.49	$116,201.21	-10%	50
380	8/1/2006	2	ER 067A-025	15883	0	$7,669,001.10	$8,719,013.86	-$1,050,012.76	14%	296
381	8/1/2006	6	BR 2854-105	14890	0	$5,117,945.00	$5,059,464.71	$58,480.29	-1%	360
382	8/1/2006	6	STA 0881-019	15662	0	$1,711,875.71	$1,704,071.98	$7,803.73	0%	50
383	8/2/2006	1	C 0252-367	14598	0	$18,926,154.14	$19,937,952.52	-$1,011,798.38	5%	380
384	8/7/2006	4	BR R400-203	15634	0	$232,132.50	$192,820.00	$39,312.50	-17%	35
385	8/8/2006	6	SHE 0831-104	15645	0	$1,031,180.75	$1,059,260.77	-$28,080.02	3%	63
386	8/10/2006	1	IM 0703-273	13385	0	$7,779,386.18	$8,886,630.09	-$1,107,243.91	14%	340
387	8/15/2006	5	STA 062A-011	14556	0	$1,528,696.84	$1,468,103.24	$60,593.60	-4%	302
388	8/15/2006	3	SHE 0403-050	15808	0	$293,462.00	$254,927.80	$38,534.20	-13%	60
389	8/16/2006	5	C 5502-057	15678	0	$640,299.71	$813,002.48	-$172,702.77	27%	84
390	8/17/2006	6	STU 4701-107	15552	0	$1,077,385.97	$1,112,443.83	-$35,057.86	3%	75
391	8/21/2006	6	STU M040-011	14811	0	$17,618,378.14	$18,433,070.80	-$814,692.66	5%	690
392	8/22/2006	3	C 0501-049	15111	0	$1,513,637.25	$1,724,172.87	-$210,535.62	14%	90
393	8/22/2006	4	BR 3852-009	14829	0	$2,875,949.04	$3,122,439.89	-$246,490.85	9%	150
394	8/24/2006	6	C R600-283	15709	0	$1,068,319.30	$1,395,580.08	-$327,260.78	31%	75
395	8/29/2006	1	STA 0405-031	15659	0	$703,241.80	$742,661.16	-$39,419.36	6%	15
396	8/31/2006	4	IM 0253-160	12623	1	$35,949,933.08	$39,026,545.73	-$3,076,612.65	9%	395
397	8/31/2006	1	NH 0061-078	15370	0	$866,980.00	$1,036,541.85	-$169,561.85	20%	50

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
398	9/6/2006	4	STA 060A-010	14368	0	$1,865,079.02	$1,872,171.76	-$7,092.74	0%	69
399	9/6/2006	4	BR 0361-052	11725	0	$4,291,121.42	$4,532,701.96	-$241,580.54	6%	160
400	9/21/2006	1	IM 0703-301	15583	0	$822,321.00	$1,611,078.77	-$788,757.77	96%	156
401	9/22/2006	4	STU R400-204	15654	0	$442,891.65	$430,570.42	$12,321.23	-3%	40
402	9/25/2006	6	C2706-033	13579	0	$14,731,461.60	$16,459,944.52	-$1,728,482.92	12%	693
403	9/26/2006	1	NH 2854-102	14773	0	$223,802.70	$231,785.65	-$7,982.95	4%	27
404	9/26/2006	6	AQC 1211-064	15236	0	$593,870.90	$602,257.83	-$8,386.93	1%	170
405	9/26/2006	3	BR 064A-008	14930	0	$1,582,889.61	$1,538,349.88	$44,539.73	-3%	361
406	10/5/2006	5	BR 0241-046	15492	0	$851,122.71	$786,267.23	$64,855.48	-8%	243
407	10/12/2006	1	IMD 0703-296	15338	0	$1,088,555.26	$1,137,790.09	-$49,234.83	5%	97
408	10/16/2006	6	STA R600-279	15600	0	$286,049.50	$283,301.60	$2,747.90	-1%	95
409	10/24/2006	5	NH 0503-063	15288	0	$466,700.50	$391,706.09	$74,994.41	-16%	60
410	11/2/2006	2	IM 0251-166	14551	0	$36,907,794.90	$76,267,336.07	-$39,359,541.17	107%	670
411	11/14/2006	6	IM 0252-384	15699	0	$1,967,361.92	$2,107,000.62	-$139,638.70	7%	220
412	11/21/2006	4	HB 0853-064	15785	0	$1,139,639.95	$1,168,215.74	-$28,575.79	3%	85
413	11/22/2006	6	IM 076A-007	15361	0	$2,657,491.25	$2,279,401.76	$378,089.49	-14%	70
414	11/22/2006	2	C 0251-173	15753	0	$709,850.00	$754,536.50	-$44,686.50	6%	50
415	11/22/2006	3	HB 0701-173	15065	0	$4,363,308.99	$4,264,255.40	$99,053.59	-2%	60
416	11/29/2006	6	BR 0252-389	16022	0	$107,710.00	$213,179.92	-$105,469.92	98%	21
417	12/4/2006	6	BR 0021-034	15675	0	$380,390.50	$376,124.94	$4,265.56	-1%	65
418	12/5/2006	3	BR 092A-019	15109	0	$1,047,081.00	$1,102,641.66	-$55,560.66	5%	308
419	12/5/2006	6	IM R600-292	15956	0	$202,702.00	$189,061.00	$13,641.00	-7%	20
420	12/6/2006	1	STA 0091-026	15023	0	$1,419,027.30	$1,824,543.27	-$405,515.97	29%	85
421	12/6/2006	3	HB 0701-180	15435	0	$2,923,453.45	$3,030,506.98	-$107,053.53	4%	50
422	12/8/2006	2	SHE 0503-067	16008	0	$297,646.10	$297,097.98	$548.12	0%	30
423	12/15/2006	6	IM 0703-291	15179	0	$25,711,000.00	$30,747,377.83	-$5,036,377.83	20%	650
424	12/26/2006	2	STU R200-097	13129	0	$18,936,708.95	$20,956,931.09	-$2,020,222.14	11%	444

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
425	1/5/2007	6	NH 0062-020	15364	1	$3,058,631.50	$3,294,594.31	-$235,962.81	8%	120
426	1/10/2007	2	STA 109A-017	15671	0	$5,486,601.90	$5,931,780.45	-$445,178.55	8%	75
427	1/10/2007	3	HB 0063-021	15917	0	$4,343,762.30	$4,277,232.80	$66,529.50	-2%	218
428	1/18/2007	3	NH 0501-054	15923	0	$636,636.00	$603,483.72	$33,152.28	-5%	20
429	1/18/2007	6	NH 1211-065	15366	0	$2,396,540.80	$2,106,536.70	$290,004.10	-12%	90
430	1/18/2007	2	STA 0961-012	15943	0	$2,812,764.10	$3,189,730.14	-$376,966.04	13%	80
431	1/22/2007	2	BR 109A-018	15784	0	$1,561,305.75	$1,603,062.31	-$41,756.56	3%	100
432	1/23/2007	3	IM 0702-269	15922	0	$6,097,048.50	$6,021,112.46	$75,936.04	-1%	269
433	1/24/2007	4	NH 0853-057	14839	0	$6,068,953.40	$6,526,290.08	-$457,336.68	8%	120
434	1/26/2007	3	IM 0702-270	15927	0	$3,415,296.65	$3,739,571.06	-$324,274.41	9%	75
435	1/29/2007	2	STA 096A-038	15669	0	$3,030,336.55	$3,130,074.46	-$99,737.91	3%	68
436	1/29/2007	2	STA 069A-021	15668	0	$2,963,668.63	$3,427,311.05	-$463,642.42	16%	52
437	1/29/2007	2	STA 012A-042	15667	0	$2,587,537.90	$2,822,014.85	-$234,476.95	9%	60
438	1/29/2007	4	NH 0341-070	15618	0	$2,797,888.90	$3,025,059.51	-$227,170.61	8%	100
439	1/29/2007	6	SHE 0931-027	15828	0	$466,133.00	$461,203.90	$4,929.10	-1%	40
440	2/1/2007	4	IM 0253-194	15746	0	$8,998,479.50	$6,952,681.49	$2,045,798.01	-23%	144
441	2/6/2007	1	STA 086A-045	15710	0	$2,697,045.45	$2,596,782.79	$100,262.66	-4%	90
442	2/6/2007	1	IM 0703-319	16034	0	$542,660.97	$531,943.88	$10,717.09	-2%	100
443	2/6/2007	4	STA 0361-082	15585	0	$2,311,991.69	$2,395,309.58	-$83,317.89	4%	52
444	2/16/2007	4	STA 0661-009	15326	0	$280,947.75	$300,880.02	-$19,932.27	7%	40
445	2/16/2007	5	HB 149A-023	15968	0	$376,572.00	$326,034.93	$50,537.07	-13%	36
446	2/16/2007	1	NH 0062-023	15601	0	$1,780,011.01	$1,814,206.90	-$34,195.89	2%	15
447	2/21/2007	3	NH 0402-070	15925	0	$3,238,445.00	$3,256,971.11	-$18,526.11	1%	157
448	2/21/2007	2	SHE 1151-020	16009	0	$317,825.19	$325,694.10	-$7,868.91	2%	20
449	2/21/2007	5	NH 1602-102	14915	0	$447,496.10	$399,753.92	$47,742.18	-11%	45
450	2/21/2007	6	NH 093A-006	15362	0	$1,433,882.92	$1,247,629.63	$186,253.29	-13%	70
451	2/26/2007	3	STA 1251-005	15919	0	$4,354,792.70	$4,113,244.63	$241,548.07	-6%	171
452	3/1/2007	5	SHE 5502-054	15505	0	$205,527.22	$235,626.06	-$30,098.84	15%	42
453	3/7/2007	4	NH 0342-044	15586	0	$2,364,652.48	$2,171,190.01	$193,462.47	-8%	50
454	3/15/2007	2	SHE 0503-066	16005	0	$1,060,278.90	$1,103,609.01	-$43,330.11	4%	75
455	3/16/2007	5	NH 1602-099	14557	1	$8,008,939.59	$8,870,143.32	-$861,203.73	11%	280
456	3/19/2007	2	SHE 1151-018	15400	0	$153,748.96	$154,379.47	-$630.51	0%	35
457	3/21/2007	2	STA 089A-011	15095	0	$8,628,074.05	$9,986,764.47	-$1,358,690.42	16%	120
458	3/21/2007	1	IM0252-388	16012	0	$4,899,999.99	$4,726,979.43	$173,020.56	-4%	65

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
459	3/21/2007	3	HB 065A-019	15920	0	$2,969,611.95	$2,816,359.57	$153,252.38	-5%	204
460	3/21/2007	1	IM 0702-262	15832	0	$5,359,129.22	$5,429,437.02	-$70,307.80	1%	75
461	3/21/2007	6	STU 0831-094	14810	0	$822,965.08	$970,879.44	-$147,914.36	18%	60
462	3/27/2007	1	STA0091-030	15967	0	$1,832,020.35	$1,697,574.39	$134,445.96	-7%	54
463	3/27/2007	6	IM 0703-308	15766	0	$2,877,507.36	$2,567,793.67	$309,713.69	-11%	70
464	3/28/2007	2	SHE 0504-050	15570	0	$399,752.79	$653,018.59	-$253,265.80	63%	30
465	4/5/2007	4	STA402A-007	16052	0	$321,392.59	$324,420.26	-$3,027.67	1%	40
466	4/10/2007	2	SHE 165A-011	15771	0	$381,523.50	$382,055.05	-$531.55	0%	30
467	4/17/2007	3	C 0702-272	16239	0	$1,537,065.69	$4,727,724.10	-$3,190,658.41	208%	212
468	4/23/2007	3	NH 0501-055	15924	0	$4,276,918.45	$3,887,944.34	$388,974.11	-9%	211
469	4/25/2007	6	NH 030A-025	15621	0	$1,063,566.55	$959,242.31	$104,324.24	-10%	40
470	5/3/2007	1	STA 006A-039	15976	0	$1,063,692.61	$1,085,562.18	-$21,869.57	2%	45
471	5/4/2007	4	SHE 0253-193	15633	0	$967,652.85	$1,071,092.03	-$103,439.18	11%	80
472	5/8/2007	1	HB 0852-101	15490	0	$2,777,777.00	$2,866,445.98	-$88,668.98	3%	110
473	5/9/2007	2	SHE 0251-175	15770	0	$706,432.45	$876,394.50	-$169,962.05	24%	45
474	5/10/2007	1	NH 0405-025	12491	0	$6,110,462.25	$6,479,259.61	-$368,797.36	6%	154
475	5/15/2007	5	STA 145A-041	16037	0	$3,396,164.50	$3,292,442.06	$103,722.44	-3%	93
476	5/15/2007	4	STA0343-029	15833	0	$457,689.68	$445,294.16	$12,395.52	-3%	6
477	5/15/2007	4	STA0631-009	15509	0	$497,454.00	$452,310.00	$45,144.00	-9%	10
478	5/15/2007	4	STA0712-015	15834	0	$802,999.00	$740,468.24	$62,530.76	-8%	12
479	5/21/2007	6	SHE0761-193	15748	0	$528,135.17	$432,410.31	$95,724.86	-18%	60
480	5/21/2007	1	STA 0703-312	15929	0	$432,723.50	$505,848.25	-$73,124.75	17%	51
481	5/23/2007	1	STA0831-105	16028	1	$2,713,890.85	$3,082,363.21	-$368,472.36	14%	70
482	6/4/2007	4	CR400-216	16148	0	$269,524.35	$323,693.70	-$54,169.35	20%	30
483	6/4/2007	5	NH 0241-044	15351	0	$1,126,094.00	$1,120,512.98	$5,581.02	0%	50
484	6/5/2007	4	STA 0343-027	15146	0	$5,794,298.35	$6,118,628.52	-$324,330.17	6%	80
485	6/5/2007	3	SHE 133A-032	15900	0	$642,889.56	$621,662.15	$21,227.41	-3%	50
486	6/6/2007	1	NH 3851-016	16080	0	$2,499,967.11	$2,608,246.83	-$108,279.72	4%	40
487	6/7/2007	1	BR 0711-014	14277	0	$3,809,936.40	$3,942,518.93	-$132,582.53	3%	140

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
488	6/13/2007	6	IM 0253-196	15910	0	$2,159,024.90	$1,856,331.80	$302,693.10	-14%	92
489	6/18/2007	1	IM0703-317	15977	0	$1,746,301.50	$1,701,292.70	$45,008.80	-3%	65
490	6/19/2007	4	SHE R400-213	16103	0	$743,656.50	$810,619.88	-$66,963.38	9%	50
491	6/19/2007	1	IR100-128	16221	0	$1,633,683.00	$2,041,814.45	-$408,131.45	25%	70
492	6/19/2007	4	NH0341-071	16216	0	$2,835,979.40	$3,530,113.07	-$694,133.67	24%	100
493	6/19/2007	6	SHE R600-284	15747	0	$734,582.00	$775,705.81	-$41,123.81	6%	60
494	6/19/2007	1	IM0703-325	16108	0	$6,112,092.41	$6,951,282.90	-$839,190.49	14%	90
495	6/27/2007	6	BR 0581-006	14959	1	$5,372,247.14	$7,247,508.25	-$1,875,261.11	35%	314
496	6/27/2007	6	STU M356-019	14417	0	$2,297,514.54	$2,360,930.89	-$63,416.35	3%	140
497	7/2/2007	6	CR600-285	15752	0	$439,085.50	$456,343.43	-$17,257.93	4%	60
498	7/6/2007	4	IM0762-044	15914	0	$9,593,034.30	$11,445,126.74	-$1,852,092.44	19%	120
499	7/19/2007	2	SHE 0504-054	16007	0	$210,362.83	$245,716.57	-$35,353.74	17%	30
500	7/20/2007	3	BR 114A-011	15108	0	$1,333,668.88	$1,282,820.50	$50,848.38	-4%	662
501	7/23/2007	4	BR 059A-032	16013	0	$423,042.00	$496,185.19	-$73,143.19	17%	45
502	7/26/2007	5	BRR500-087	16338	0	$565,038.40	$621,473.75	-$56,435.35	10%	70
503	7/30/2007	3	C065A-020	16415	0	$1,758,303.00	$2,023,621.45	-$265,318.45	15%	45
504	8/2/2007	2	STA 094A-031	14440	0	$1,329,494.60	$1,316,328.95	$13,165.65	-1%	70
505	8/3/2007	4	IM 0253-164	13192	0	$48,658,183.42	$50,379,655.55	-$1,721,472.13	4%	817
506	8/7/2007	3	HPP 0241-045	15488	0	$4,844,123.93	$5,162,456.99	-$318,333.06	7%	430
507	8/21/2007	3	SHE 0702-267	15903	1	$1,795,394.00	$1,302,746.52	$492,647.48	-27%	426
508	8/23/2007	3	C0702-273	16240	0	$2,753,004.00	$3,163,031.76	-$410,027.76	15%	391
509	8/23/2007	6	ITS SW00-457	15815	0	$521,239.95	$605,110.57	-$83,870.62	16%	110
510	8/24/2007	5	NH 5502-055	15595	0	$695,018.91	$971,600.49	-$276,581.58	40%	52
511	8/27/2007	3	C0701-190	16540	0	$319,349.00	$286,081.44	$33,267.56	-10%	20
512	8/28/2007	1	CR100-126	16026	0	$7,911,503.50	$8,370,478.93	-$458,975.43	6%	100
513	8/30/2007	6	BR-0253-192	15573	0	$3,648,394.17	$3,625,369.21	$23,024.96	-1%	209
515	9/10/2007	3	C0701-187	16213	0	$657,969.25	$732,300.95	-$74,331.70	11%	65
516	9/10/2007	6	IM 0703-331	16312	0	$433,045.13	$439,169.40	-$6,124.27	1%	35
517	9/10/2007	1	IM0703-323	16106	0	$1,011,002.62	$1,002,852.63	$8,149.99	-1%	169
518	9/11/2007	5	NH 1601-056	15630	0	$579,742.00	$528,262.58	$51,479.42	-9%	66

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
519	9/18/2007	4	IM R400-215	16146	0	$436,128.40	$460,033.68	-$23,905.28	5%	30
520	9/24/2007	3	STA 133A-031	15852	0	$4,644,444.44	$4,722,756.72	-$78,312.28	2%	418
521	10/18/2007	2	BR 0961-008	13141	1	$27,657,855.15	$32,068,284.00	-$4,410,428.85	16%	1278
522	10/23/2007	1	SHE0092-019	16018	0	$422,773.77	$437,734.30	-$14,960.53	4%	25
523	10/23/2007	6	IM 0703-336	16574	0	$534,191.70	$557,985.75	-$23,794.05	4%	30
524	10/29/2007	3	STA 340A-013	15879	0	$3,795,553.40	$3,990,718.66	-$195,165.26	5%	218
525	10/29/2007	3	BR R300-130	15661	0	$985,828.25	$1,335,902.44	-$350,074.19	36%	60
526	11/27/2007	1	STA 0091-031	16035	0	$4,997,321.45	$5,023,454.65	-$26,133.20	1%	150
527	11/28/2007	5	BR 0241-047	15676	1	$748,423.19	$841,968.00	-$93,544.81	12%	84
528	12/4/2007	4	BR1192-015	14654	0	$2,926,771.59	$2,920,176.63	$6,594.96	0%	90
529	12/4/2007	3	SHE 082A-010	16552	0	$227,108.79	$223,444.98	$3,663.81	-2%	30
530	12/5/2007	2	C120A-007	16624	0	$637,840.00	$701,520.47	-$63,680.47	10%	20
531	12/6/2007	2	STA 012A-040	15026	0	$1,489,425.73	$1,487,565.17	$1,860.56	0%	65
532	12/10/2007	4	STS R400-229	16621	0	$696,740.75	$711,963.51	-$15,222.76	2%	100
533	12/13/2007	1	C0703-338	16645	0	$151,173.40	$145,795.76	$5,377.64	-4%	10
534	12/21/2007	4	BR0341-069	15549	0	$2,558,916.20	$2,638,559.57	-$79,643.37	3%	200
535	12/21/2007	2	C 0504-055	16174	0	$670,854.00	$692,073.39	-$21,219.39	3%	40
536	12/27/2007	5	SHE 160A-009	16360	0	$617,019.71	$676,453.51	-$59,433.80	10%	40
537	1/8/2008	3	STA133A-034	16445	0	$4,147,695.60	$4,009,618.34	$138,077.26	-3%	55
538	1/8/2008	3	NH 0821-085	16451	0	$3,384,793.00	$3,414,058.73	-$29,265.73	1%	277
539	1/10/2008	1	IM 0703-326	16096	0	$2,947,822.20	$3,158,028.56	-$210,206.36	7%	220
540	1/15/2008	4	NH0853-066	16050	0	$6,895,292.68	$7,331,382.75	-$436,090.07	6%	105
541	1/15/2008	3	CC 0821-084	16416	0	$6,695,038.60	$7,320,403.00	-$625,364.40	9%	427
542	1/22/2008	3	STA139A-029	16491	0	$1,086,860.86	$922,942.13	$163,918.73	-15%	30
543	1/25/2008	3	IM0701-189	16492	0	$5,293,502.15	$5,251,625.76	$41,876.39	-1%	100
544	1/25/2008	1	IM 0252-392	16172	0	$3,248,323.60	$3,406,015.24	-$157,691.64	5%	60
545	1/25/2008	5	NH 160A-002	16043	0	$245,745.00	$247,008.54	-$1,263.54	1%	70
546	1/25/2008	6	BR 0581-008	15576	0	$4,844,120.65	$4,776,526.31	$67,594.34	-1%	390
547	1/30/2008	3	HB131A-033	16189	0	$6,496,397.30	$7,049,230.62	-$552,833.32	9%	257
548	1/31/2008	4	STA 093A-007	15652	0	$2,559,169.65	$2,472,719.21	$86,450.44	-3%	80

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
549	2/4/2008	2	STUR200-110	13590	0	$22,577,777.77	$26,577,777.00	-$3,999,999.23	18%	570
550	2/8/2008	4	NH0342-043	15514	0	$4,773,079.65	$5,347,878.20	-$574,798.55	12%	80
551	2/11/2008	1	STA 0831-099	15283	0	$375,032.73	$418,519.04	-$43,486.31	12%	40
552	2/11/2008	3	HB 0131-050	15918	0	$1,993,539.00	$2,045,425.01	-$51,886.01	3%	37
553	2/11/2008	4	C0253-199	16222	0	$13,751,365.26	$14,832,576.55	-$1,081,211.29	8%	176
554	2/11/2008	6	ITS0361-087	16564	0	$602,474.00	$668,599.00	-$66,125.00	11%	107
555	2/13/2008	4	NH0342-048	16145	0	$5,100,598.18	$5,458,419.42	-$357,821.24	7%	80
556	2/15/2008	6	C 0253-202	16736	0	$820,290.00	$837,848.65	-$17,558.65	2%	10
557	2/19/2008	6	CCR600-303	16448	0	$521,358.25	$557,466.57	-$36,108.32	7%	68
558	2/21/2008	1	SHE0741-016	16019	0	$184,655.00	$303,827.75	-$119,172.75	65%	30
559	2/21/2008	2	SHE050A-007	16420	0	$1,517,520.62	$1,594,610.55	-$77,089.93	5%	68
560	2/22/2008	3	HB135A-024	16446	1	$4,567,070.50	$4,950,319.80	-$383,249.30	8%	60
561	2/25/2008	5	NH 2851-004	16617	0	$5,012,675.57	$6,310,335.28	-$1,297,659.71	26%	75
562	2/27/2008	5	NH 5502-060	16485	0	$656,970.65	$632,591.80	$24,378.85	-4%	17
563	2/27/2008	5	NH 1602-116	16278	0	$5,376,287.95	$5,373,552.89	$2,735.06	0%	60
564	3/3/2008	6	STA 391A-003	15764	0	$625,811.84	$714,426.24	-$88,614.40	14%	54
565	3/3/2008	6	STA2873-148	16047	0	$222,684.50	$215,194.57	$7,489.93	-3%	40
566	3/3/2008	6	IM 0252-386	15763	0	$3,635,675.58	$3,969,171.62	-$333,496.04	9%	90
567	3/6/2008	6	NH0405-032	15928	0	$1,479,928.52	$1,527,610.19	-$47,681.67	3%	45
568	3/7/2008	4	STA060A-012	16408	0	$834,834.00	$724,942.35	$109,891.65	-13%	21
569	3/7/2008	6	NH 0404-046	15939	0	$816,806.10	$641,577.81	$175,228.29	-21%	60
570	3/10/2008	5	STA 017A-010	15176	1	$3,362,381.60	$3,256,497.47	$105,884.13	-3%	60
571	3/11/2008	2	STA0252-397	16421	0	$6,133,402.89	$6,650,422.15	-$517,019.26	8%	80
572	3/12/2008	1	CR100-152	16758	0	$150,000.00	$24,658.82	$125,341.18	-84%	10
573	3/17/2008	6	STA 002A-001	16062	0	$2,419,993.55	$1,864,517.55	$555,476.00	-23%	150
574	3/18/2008	2	STU 0251-329	16076	0	$16,752,092.55	$17,860,344.17	-$1,108,251.62	7%	237
575	3/19/2008	3	HB0132-017	16604	0	$4,470,973.70	$4,776,965.37	-$305,991.67	7%	241
576	3/19/2008	1	STA079A-011	16443	0	$1,881,174.62	$2,096,754.08	-$215,579.46	11%	48
577	3/19/2008	1	C 0702-274	16272	0	$5,042,261.52	$5,384,578.90	-$342,317.38	7%	203
578	3/21/2008	3	SHE0702-276	16453	0	$9,741,062.12	$10,413,025.35	-$671,963.23	7%	100
579	3/26/2008	6	STA 072A-030	15877	0	$972,690.70	$925,690.77	$46,999.93	-5%	60

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
580	3/26/2008	1	IM0703-327	16274	0	$4,526,967.75	$5,876,595.78	-$1,349,628.03	30%	75
581	3/27/2008	4	STA052A-029	15884	0	$623,715.96	$533,963.68	$89,752.28	-14%	28
582	3/27/2008	2	SRP083A-032	16406	0	$161,558.45	$163,768.75	-$2,210.30	1%	20
583	4/2/2008	1	BR 0403-051	16532	0	$239,531.50	$278,561.51	-$39,030.01	16%	25
584	4/7/2008	5	NH 1603-025	16277	0	$2,267,006.50	$2,328,360.04	-$61,353.54	3%	60
585	4/7/2008	3	STA1251-006	16494	0	$2,976,827.40	$3,088,246.76	-$111,419.36	4%	490
586	4/8/2008	5	C 5502-063	16605	0	$4,515,688.50	$6,629,906.70	-$2,114,218.20	47%	98
587	4/11/2008	6	IM0252-393	16055	0	$3,399,903.26	$3,688,405.21	-$288,501.95	8%	92
588	4/14/2008	2	NH 2871-031	15069	0	$17,300,345.31	$18,120,832.26	-$820,486.95	5%	394
589	4/15/2008	3	SHE 0501-056	16595	0	$750,374.30	$823,039.99	-$72,665.69	10%	45
590	4/15/2008	1	C 1191-023	15868	0	$2,287,435.80	$2,233,246.53	$54,189.27	-2%	86
591	4/16/2008	4	STA3852-011	15819	0	$1,424,425.00	$1,471,066.86	-$46,641.86	3%	20
592	4/18/2008	2	C 067A-026	15904	0	$1,047,059.00	$1,193,542.30	-$146,483.30	14%	60
593	4/21/2008	1	IM 0703-322	16102	0	$7,401,433.81	$7,516,077.73	-$114,643.92	2%	192
594	4/25/2008	6	NH 030A-026	15751	0	$1,689,662.64	$1,475,089.14	$214,573.50	-13%	50
595	4/28/2008	1	IM 0252-383	15555	1	$29,407,999.45	$33,126,306.29	-$3,718,306.84	13%	579
596	4/28/2008	5	NH 1602-114	16042	0	$26,692,000.00	$29,337,974.91	-$2,645,974.91	10%	961
597	4/29/2008	1	HB0403-052	16618	0	$299,000.00	$298,466.24	$533.76	0%	35
598	4/30/2008	3	IM 0702-281	16801	0	$2,983,703.00	$4,515,760.35	-$1,532,057.35	51%	128
599	5/6/2008	1	IM 0705-077	16046	0	$16,754,116.07	$18,051,588.14	-$1,297,472.07	8%	180
600	5/6/2008	2	NH 0503-064	15568	0	$2,237,574.90	$2,136,318.62	$101,256.28	-5%	100
601	5/7/2008	1	STA009A-025	16680	0	$2,965,399.12	$2,955,205.41	$10,193.71	0%	50
602	5/7/2008	4	STA 0343-026	15145	0	$3,969,728.35	$4,464,171.69	-$494,443.34	12%	80
603	5/8/2008	5	NH 5501-013	15666	1	$8,236,859.30	$10,524,853.62	-$2,287,994.32	28%	387
604	5/9/2008	5	NH 5502-059	16048	0	$1,097,998.85	$908,032.90	$189,965.95	-17%	50
605	5/15/2008	1	STA 009A-001	16366	0	$1,895,895.95	$1,850,539.75	$45,356.20	-2%	60
606	5/21/2008	2	STS 1151-021	16606	0	$344,563.80	$347,252.02	-$2,688.22	1%	25
607	5/21/2008	2	NH0504-056	16569	0	$3,985,000.00	$3,816,523.19	$168,476.81	-4%	150

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
608	5/22/2008	1	STA0703-334	16563	0	$1,256,471.75	$1,228,980.43	$27,491.32	-2%	45
609	5/27/2008	6	SHE 2854-114	16600	0	$236,195.00	$216,411.50	$19,783.50	-8%	40
610	5/28/2008	3	NH0063-024	16636	0	$722,341.00	$693,239.18	$29,101.82	-4%	53
611	5/28/2008	6	IM 0704-207	15951	0	$1,532,512.79	$1,250,498.28	$282,014.51	-18%	90
612	5/30/2008	5	C 090A-002	16773	0	$380,168.94	$528,113.06	-$147,944.12	39%	25
613	6/2/2008	6	SHE 0761-195	16495	0	$908,005.02	$945,991.76	-$37,986.74	4%	60
614	6/11/2008	1	C0703-337	16641	0	$5,134,640.60	$4,762,106.33	$372,534.27	-7%	100
615	6/16/2008	5	NH 1602-112	15504	0	$14,578,201.75	$17,046,495.77	-$2,468,294.02	17%	487
616	6/18/2008	1	C0703-330	16410	0	$1,398,971.50	$1,427,679.91	-$28,708.41	2%	110
617	6/23/2008	1	IM 070A-003	16701	0	$2,779,795.00	$2,832,322.11	-$52,527.11	2%	130
618	6/23/2008	6	EPSW00-541	16241	0	$871,503.58	$962,668.87	-$91,165.29	10%	223
619	6/27/2008	4	SHE3921-008	16623	0	$314,002.50	$373,566.05	-$59,563.55	19%	35
620	6/27/2008	3	C0402-073	16886	0	$844,309.75	$844,309.75	$0.00	0%	32
621	11/9/2009	6	BR R600-357	17416	0	$262,114.25	$251,598.17	$10,516.08	-4%	47
622	7/29/2010	2	C021A-001	17604	1	$269,274.50	$323,949.97	$269,274.50	20%	25
623	7/28/2008	6	STA 0404-044	15821	1	$939,122.93	$860,460.00	$178,536.47	-8%	40
624	5/6/2011	1	STA008A-007	17902	0	$941,202.45	$1,118,927.55	-$177,725.10	19%	40
625	7/9/2008	2	STA069A-023	16704	0	$953,926.22	$1,122,134.73	-$168,208.51	18%	50
626	11/23/2010		MC SW00-910	18212	0	$972,910.84	$949,311.14	$23,599.70	-2%	170
627	7/14/2009	2	C430-013	16982	0	$984,000.00	$1,205,684.87	-$221,684.87	23%	60
628	6/9/2009	3	ES30701-197	17243	0	$997,970.00	$1,156,907.46	-$158,937.46	16%	45
629	5/13/2010	5	STA145A-044	16989	0	$1,012,145.00	$1,380,717.21	-$368,572.21	36%	119
630	9/16/2008	3	NH 0501-057	16816	0	$1,014,918.90	$871,739.42	$143,179.48	-14%	53
631	7/11/2011	1	SHEM515-004	17658	0	$1,081,024.10	$1,061,865.68	$19,158.42	-2%	50
632	10/23/2008	3	SHE 0821-082	15873	0	$1,083,000.00	$1,061,317.18	$21,682.82	-2%	247
633	12/9/2009	6	BRR600-353	17395	0	$1,084,000.00	$1,135,559.56	-$51,559.56	5%	95
634	6/2/2009	5	ES5 1602-122	17183	0	$1,094,241.00	$1,225,248.49	-$131,007.49	12%	25
635	4/22/2009	6	ES6 177A-006	17251	0	$1,100,655.25	$1,296,018.59	-$195,363.34	18%	75

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
636	6/24/2010	4	IM 0762-046	17600	0	$1,112,535.62	$1,249,185.51	-$136,649.89	12%	80
637	5/19/2010	3	C 0821-091	17701	0	$1,128,603.25	$1,267,054.38	-$138,451.13	12%	157
638	8/19/2009	3	ES3340A-015	17253	0	$1,135,716.90	$1,159,818.84	-$24,101.94	2%	50
639	5/24/2011	6	NH0404-049	17700	0	$1,135,892.80	$1,043,346.63	$92,546.17	-8%	65
640	11/30/2010	4	C052A-035	17703	0	$1,136,181.00	$1,199,620.28	-$63,439.28	6%	90
641	12/10/2009		C SW00-792	17550	0	$1,155,693.00	$983,080.64	$172,612.36	-15%	147
642	2/28/2011	2	STA045A-009	18029	0	$1,224,218.00	$1,319,730.33	-$95,512.33	8%	55
643	3/9/2009	6	STU 0404-047	16705	0	$1,258,560.90	$1,290,629.31	-$32,068.41	3%	40
644	6/3/2009	4	ES4 0361-089	16909	0	$1,277,322.60	$1,141,172.34	$136,150.26	-11%	25
645	5/12/2010	3	NH0402-078	17655	0	$1,283,923.65	$1,221,537.01	$62,386.64	-5%	35
646	12/20/2010	4	CR400-250	17767	0	$1,356,091.00	$1,720,568.41	-$364,477.41	27%	177
647	5/17/2010	3	C0701-205	17685	0	$1,398,999.00	$1,424,749.87	-$25,750.87	2%	55
648	4/8/2009	6	ES60703-350	17246	0	$1,417,544.75	$1,429,095.74	-$11,550.99	1%	58
649	1/14/2010	4	ES4 0343-030	17208	0	$1,453,413.00	$1,332,751.50	$120,661.50	-8%	15
650	6/1/2009	1	ES1 0703-353	17344	0	$1,459,000.00	$1,816,581.05	-$357,581.05	25%	90
651	8/13/2008	4	STA R400-147	14373	0	$1,479,416.28	$1,422,919.47	$56,496.81	-4%	75
652	3/30/2010	6	ES6 002A-003	17615	0	$1,509,306.60	$1,460,177.87	$49,128.73	-3%	70
653	6/30/2010	1	FBR 0703-357	17671	0	$1,524,680.50	$1,452,607.49	$72,073.01	-5%	116
654	8/23/2011	6	BR2706-036	18360	0	$1,549,235.00	$1,868,521.39	-$319,286.39	21%	29
655	9/21/2009	6	IMR600-321	16807	0	$1,562,460.74	$1,586,940.21	-$24,479.47	2%	55
656	9/15/2009	2	BR0101-024	14089	0	$1,581,000.00	$1,634,812.09	-$53,812.09	3%	95
657	10/1/2009	3	BR0701-192	16689	0	$1,595,000.00	$1,779,807.32	-$184,807.32	12%	110
658	12/16/2010	6	FSAR600-386	18022	0	$1,609,873.35	$1,527,849.07	$82,024.28	-5%	100

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
659	9/11/2008	3	C0702-284	16871	0	$1,648,000.00	$1,765,322.26	-$117,322.26	7%	85
660	2/26/2009	6	STAC110-024	16161	0	$1,688,181.95	$1,590,942.67	$97,239.28	-6%	80
661	5/11/2009	3	NH 0063-028	17099	0	$1,702,499.63	$1,687,996.27	$14,503.36	-1%	73
662	3/8/2011	2	STA0504-061	17824	0	$1,710,437.93	$1,975,287.48	-$264,849.55	15%	40
663	7/7/2010	1	STA2854-118	17264	0	$1,719,481.25	$2,094,076.95	-$374,595.70	22%	35
664	1/12/2011	2	FBRC160-008	18115	1	$1,742,634.41	$2,017,649.11	$1,742,634.41	16%	217
665	10/14/2010	1	ES1 0705-078	17952	0	$1,766,906.71	$2,242,373.14	-$475,466.43	27%	80
666	10/1/2009	2	BR 0504-038	12854	0	$1,786,812.94	$2,065,416.98	-$278,604.04	16%	192
667	4/18/2011	4	STA0361-095	17619	0	$1,858,792.00	$1,806,588.74	$52,203.26	-3%	50
668	7/15/2009	3	ES3 0821-087	17304	0	$1,891,616.90	$2,367,371.54	-$475,754.64	25%	113
669	5/13/2009	3	C0702-292	17066	0	$1,892,162.13	$2,610,572.22	-$718,410.09	38%	525
670	7/23/2010	2	FBR0242-047	17675	0	$2,006,630.00	$2,212,716.54	-$206,086.54	10%	150
671	7/16/2008	6	STA0831-106	16263	0	$2,011,980.45	$2,061,561.60	-$49,581.15	2%	70
672	4/20/2011	3	BR0701-207	18046	0	$2,037,651.15	$1,907,780.36	$129,870.79	-6%	90
673	6/17/2010	1	IM0703-358	17711	0	$2,040,049.60	$2,213,045.87	-$172,996.27	8%	60
674	5/20/2009	5	ES5 1603-027	17144	0	$2,046,567.05	$2,286,397.81	-$239,830.76	12%	40
675	10/20/2008	2	BRS120A-008	16731	0	$2,049,430.27	$2,111,678.56	-$62,248.29	3%	110
676	2/17/2010	3	NH 0821-088	17489	0	$2,059,265.97	$2,170,804.13	-$111,538.16	5%	90
677	3/14/2011	5	NH 2852-017	17184	0	$2,067,766.61	$2,321,410.25	-$253,643.64	12%	30
678	7/15/2009	2	NH0504-058	17072	0	$2,096,549.30	$2,354,342.18	-$257,792.88	12%	66
679	4/8/2009	6	ES6R600-346	17250	0	$2,144,287.14	$1,871,573.17	$272,713.97	-13%	70
680	5/6/2009	5	ES5 0242-045	16767	0	$2,152,914.80	$3,074,351.83	-$921,437.03	43%	65
681	3/17/2011	5	NH 0241-056	18093	0	$2,273,283.00	$2,625,278.83	-$351,995.83	15%	30
682	10/29/2010	5	NH 4912-001	17636	0	$2,303,405.59	$2,251,355.80	$52,049.79	-2%	123
683	10/29/2010	4	STA0712-014	15697	0	$2,320,885.10	$2,563,170.56	-$242,285.46	10%	95
684	9/16/2010	6	STA083A-036	17437	0	$2,333,728.50	$2,303,544.35	$30,184.15	-1%	100
685	8/17/2009	4	STA1191-029	17407	0	$2,340,714.85	$2,353,806.46	-$13,091.61	1%	50
686	3/21/2011	1	STA0362-030	17891	0	$2,349,462.00	$2,645,310.14	-$295,848.14	13%	42
687	3/30/2010	4	STA157A-010	15653	0	$2,378,047.60	$2,604,807.41	-$226,759.81	10%	100

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
688	8/27/2009	2	ES20243-076	17271	0	$2,419,795.25	$2,940,741.28	-$520,946.03	22%	200
689	8/18/2009	6	IM0881-021	16555	0	$2,432,554.19	$3,128,757.82	-$696,203.63	29%	135
690	8/13/2009	5	ES5160A-010	17269	0	$2,447,212.20	$2,828,930.99	-$381,718.79	16%	160
691	5/24/2011	6	NHR600-376	17884	0	$2,491,375.18	$2,426,012.47	$65,362.71	-3%	70
692	10/13/2010	3	IM 0702-305	17813	0	$2,501,868.20	$3,475,691.66	-$973,823.46	39%	70
693	5/24/2011	5	NH 172A-017	17637	0	$2,571,896.10	$2,473,498.71	$98,397.39	-4%	87
694	12/9/2010	3	NH0401-020	17969	0	$2,608,999.00	$2,481,583.15	$127,415.85	-5%	40
695	7/27/2009	5	BR 5502-053	15491	1	$2,644,935.55	$2,691,045.00	$117,996.07	2%	389
696	4/12/2010	1	STA2854-119	17263	0	$2,662,412.20	$2,596,928.76	$65,483.44	-2%	75
697	10/21/2008	4	BR 0361-088	16586	0	$2,712,914.95	$2,829,131.17	-$116,216.22	4%	92
698	4/8/2009	6	ES6 0252-402	17255	0	$2,775,094.21	$2,849,420.83	-$74,326.62	3%	100
699	2/24/2010	4	ES4 0061-080	17033	0	$2,801,243.94	$3,075,006.89	-$273,762.95	10%	70
700	10/23/2009	4	C0253-201	16390	0	$2,833,973.85	$2,911,126.78	-$77,152.93	3%	151
701	6/24/2010	6	IM0704-221	17704	0	$2,834,922.00	$2,469,395.91	$365,526.09	-13%	77
702	5/20/2009	5	ES5 2852-016	17145	0	$2,839,072.81	$3,023,776.12	-$184,703.31	7%	55
703	11/23/2010	2	STA0505-044	17823	0	$2,883,475.47	$3,379,670.30	-$496,194.83	17%	65
704	4/22/2010	6	NH 2873-157	17533	0	$2,894,701.75	$2,950,516.40	-$55,814.65	2%	125
705	12/11/2009	3	IM 0701-203	17452	0	$2,949,052.00	$3,011,916.17	-$62,864.17	2%	80
706	2/9/2010	1	IM 0703-352	17316	0	$2,955,811.15	$2,939,651.79	$16,159.36	-1%	75
707	10/15/2008	5	PLH 150A-007	16706	0	$2,987,574.90	$3,072,572.00	-$84,997.10	3%	40
708	6/1/2009	1	STA 119A-053	16386	0	$2,989,957.78	$3,934,582.04	-$944,624.26	32%	90
709	5/4/2009	6	ES60761-200	17249	0	$3,023,563.74	$3,407,253.89	-$383,690.15	13%	125
710	7/25/2011	4	STA052A-033	17495	0	$3,046,312.28	$3,302,102.01	-$255,789.73	8%	81
711	9/23/2010	6	STA177A-007	17734	1	$3,107,176.94	$3,516,793.22	$3,107,176.94	13%	276
712	3/24/2010	4	STA0853-065	15835	0	$3,299,328.29	$4,578,812.43	-$1,279,484.14	39%	75
713	10/23/2009	3	NH 0821-086	17242	0	$3,342,857.00	$3,784,368.60	-$441,511.60	13%	353
714	6/25/2009	3	IM0702-285	16891	0	$3,347,327.75	$3,473,165.38	-$125,837.63	4%	113
715	6/29/2010	5	FBR5502-068	17670	0	$3,491,481.00	$3,805,055.69	-$313,574.69	9%	463
716	4/20/2010	5	NH5502-067	17530	0	$3,529,926.50	$3,600,395.75	-$70,469.25	2%	106

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
717	5/6/2009	6	BR0072-015	15575	0	$3,597,791.14	$3,839,052.65	-$241,261.51	7%	290
718	10/17/2008	5	NH1601-058	15950	0	$3,687,694.70	$3,769,299.40	-$81,604.70	2%	110
719	10/20/2010	3	ES35502-069	17739	0	$3,689,980.50	$3,490,658.08	$199,322.42	-5%	65
720	5/20/2009	4	ES4 0141-020	15511	0	$3,792,436.35	$4,289,318.95	-$496,882.60	13%	113
721	4/14/2010	6	NHC010-100	17168	1	$3,808,889.81	$4,950,785.00	-$249,874.35	30%	151
722	7/28/2009	4	BR0341-068	15548	0	$3,822,040.00	$3,964,266.28	-$142,226.28	4%	265
723	5/20/2010	5	NH 2851-005	17559	0	$3,915,572.76	$3,608,443.68	$307,129.08	-8%	63
724	9/27/2010	3	NH050A-013	17738	0	$3,919,895.31	$3,908,252.27	$11,643.04	0%	120
725	6/15/2009	4	ES40253-206	17167	0	$3,940,998.98	$3,739,866.85	$201,132.13	-5%	74
726	9/11/2008	6	STU M193-001	16999	0	$3,968,834.70	$4,222,858.53	-$254,023.83	6%	292
727	2/9/2009	4	NH0341-073	16522	0	$4,045,678.90	$4,443,349.30	-$397,670.40	10%	110
728	12/18/2008	5	NH 1602-117	16661	0	$4,108,320.58	$4,740,206.53	-$631,885.95	15%	287
729	7/27/2009	2	ST C140-010	16967	0	$4,215,868.36	$5,167,374.85	-$951,506.49	23%	70
730	4/13/2011	3	STA 0911-006	17788	0	$4,264,379.83	$4,207,859.61	$56,520.22	-1%	130
731	4/20/2010	4	IM0253-211	17648	0	$4,268,360.98	$3,922,305.46	$346,055.52	-8%	83
732	6/2/2010	4	STA0362-029	17216	0	$4,343,627.51	$4,491,014.54	-$147,387.03	3%	65
733	2/24/2010	2	ES20504-060	17665	0	$4,406,202.39	$5,194,128.17	-$787,925.78	18%	110
734	2/11/2010	1	ES1 0243-079	17616	0	$4,527,417.86	$4,614,399.46	-$86,981.60	2%	70
735	7/29/2009	1	ES1 0852-095	14976	1	$4,578,596.89	$4,947,769.00	$4,578,596.89	8%	180
736	3/10/2010	3	ES30141-021	17617	0	$4,608,918.98	$5,366,293.27	-$757,374.29	16%	208
737	1/22/2009	4	C0342-049	16620	0	$4,611,791.00	$4,657,458.79	-$45,667.79	1%	220
738	12/7/2010	3	FBR 0241-053	17672	0	$4,660,864.00	$4,417,872.14	$242,991.86	-5%	309
739	5/25/2010	5	NH 1603-028	17765	0	$4,859,868.05	$4,939,373.98	-$79,505.93	2%	70
740	4/19/2011	3	STA141A-035	17361	0	$4,867,005.55	$5,216,205.68	-$349,200.13	7%	80
741	3/9/2010	5	ES5 1602-125	17357	0	$5,165,043.40	$6,133,318.72	-$968,275.32	19%	113
742	2/9/2010	5	ES51602-123	17282	0	$5,293,814.51	$5,713,969.94	-$420,155.43	8%	454

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
743	8/22/2008	1	NH 2854-109	15049	1	$5,395,771.45	$5,754,945.00	-$337,888.17	7%	206
744	1/11/2011	5	NH160A-011	17280	0	$5,430,545.00	$5,868,652.92	-$438,107.92	8%	238
745	8/27/2009	3	NH0402-072	16493	1	$5,648,000.00	$7,154,843.66	-$1,186,736.26	27%	422
746	2/9/2010	2	IM0251-337	17391	0	$6,051,601.78	$6,130,871.76	-$79,269.98	1%	135
747	3/3/2009	4	STA0661-011	16214	1	$6,060,381.55	$6,328,671.00	$6,060,381.55	4%	95
748	5/27/2009	1	ES10091-032	16068	0	$6,105,597.70	$7,261,795.27	-$1,156,197.57	19%	155
749	7/11/2011	4	FSA0762-048	18284	0	$6,174,337.21	$6,661,282.79	-$486,945.58	8%	85
750	12/10/2010	1	STA086A-047	16275	0	$6,319,919.23	$6,694,389.79	-$374,470.56	6%	225
751	7/19/2010	4	ES4 0853-072	17113	0	$6,373,187.25	$6,742,933.96	-$369,746.71	6%	160
752	1/25/2010	3	ES3 0702-297	17303	0	$6,422,888.00	$7,671,012.69	-$1,248,124.69	19%	266
753	5/4/2009	6	BR0253-198	16170	0	$6,467,497.44	$6,237,892.87	$229,604.57	-4%	540
754	12/29/2008	5	C1601-057	15916	0	$6,562,928.80	$6,393,350.45	$169,578.35	-3%	240
755	4/14/2009	1	ES1 0702-283	16869	0	$6,756,523.31	$6,908,496.29	-$151,972.98	2%	130
756	6/2/2009	3	ES3092A-022	17187	0	$6,913,441.64	$7,083,341.93	-$169,900.29	2%	501
757	4/28/2009	5	ES5 062A-013	16870	0	$6,919,621.03	$9,098,293.00	-$2,178,671.97	31%	143
758	4/19/2010	6	BR M356-022	16696	0	$6,959,186.05	$7,941,801.05	-$982,615.00	14%	365
759	4/7/2009	2	IM 0251-333	16830	0	$7,035,016.35	$6,781,255.27	$253,761.08	-4%	171
760	2/12/2009	3	HB092A-020	16188	0	$7,101,891.27	$7,035,701.17	$66,190.10	-1%	285
761	8/5/2009	1	ES1 2854-117	17265	0	$7,361,000.00	$8,902,645.07	-$1,541,645.07	21%	325
762	7/6/2009	3	ES3 0131-055	17174	0	$7,873,145.83	$8,541,607.97	-$668,462.14	8%	441
763	5/12/2011	6	FBR0704-220	17537	1	$7,996,860.67	$9,340,057.38	$7,996,860.67	17%	255
764	5/12/2009	6	ES60761-201	17248	0	$8,043,169.04	$8,292,777.32	-$249,608.28	3%	400
765	1/4/2011	2	IM0251-340	17846	0	$8,826,504.60	$9,930,426.45	-$1,103,921.85	13%	160
766	3/29/2011	3	IM0702-303	17766	0	$8,967,234.00	$10,320,337.79	-$1,353,103.79	15%	108
767	5/12/2009	1	ES1 R100-157	16819	0	$9,088,058.83	$9,354,275.93	-$266,217.10	3%	200

Proj. ID.	Award Date	Region	Proj Number	Subaccount	Claim/ No Claim	Award (Bid) Amt	Actual Paid Amount (Net Earnings from Final Pay Estimate)	Budget Variation	Δ C	Original Time Allowed
768	2/9/2010	4	IM0253-210	17622	0	$9,384,771.55	$9,503,815.87	-$119,044.32	1%	157
769	7/1/2009	4	STA3852-013	17110	0	$9,819,194.75	$9,768,305.17	$50,889.58	-1%	130
770	5/12/2010	1	NH R100-131	16262	0	$10,000,000.00	$10,812,185.39	-$812,185.39	8%	240
771	10/19/2010	5	NH1601-061	17635	0	$10,280,721.20	$10,586,237.05	-$305,515.85	3%	202
772	9/11/2009	2	ES22871-032	17024	0	$10,488,687.33	$10,426,274.54	$62,412.79	-1%	357
773	10/16/2008	1	C0252-390	16025	1	$10,913,172.50	$11,273,400.00	-$355,452.61	3%	150
774	7/1/2009	4	ES40762-045	17169	0	$11,337,839.38	$13,386,020.96	-$2,048,181.58	18%	135
775	7/9/2008	4	STA0342-037	13808	0	$12,764,337.24	$13,863,043.69	-$1,098,706.45	9%	260
776	2/5/2009	2	NH 016A-039	15915	1	$15,191,941.93	$17,219,626.00	$15,191,941.93	13%	290
777	5/5/2010	6	STU 0831-107	16657	1	$16,421,806.87	$18,986,696.00	$16,421,806.87	16%	350
778	4/28/2010	6	ES6 0852-103	17679	0	$17,172,771.47	$18,136,684.97	$17,172,771.47	6%	440
779	5/18/2010	6	IM2254-074	16417	0	$20,293,515.37	$22,112,020.68	-$1,818,505.31	9%	385
780	7/29/2008	6	CR 600-275	15564	1	$21,624,300.00	$23,894,024.10	-$2,269,724.10	10%	630
781	5/27/2009	6	ES64701-118	17256	0	$22,337,790.82	$25,686,939.76	-$3,349,148.94	15%	400

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
1	59	24	69%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
2	36	-4	-10%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
3	117	5	4%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
4	173	68	65%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	
5	129	39	43%	Schd. dys	SAFETY	Safety	
6	70	0	0%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	
7	50	0	0%	Schd. dys	SAFETY	Safety	ASPHALT
8	119	44	59%	Schd. dys	HAZARDOUS LOCATIONS	MISCELLANEOUS	
9	194	-6	-3%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
10	51	-9	-15%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	COMBINATION ASPHALT & CONCRETE
11	147	27	23%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
12	55	-70	-56%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	COMBINATION ASPHALT & CONCRETE
13	43	-2	-4%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
14	190	0	0%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
15	345	0	0%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
16	752	422	128%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
17	189	9	5%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
18	28	-2	-7%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
19	120	8	7%	Fixed date	SAFETY	Safety	ASPHALT
20	111	16	17%	Schd. dys	SAFETY	Safety	ASPHALT
21	34	-1	-3%	Schd. dys	SAFETY	Safety	ASPHALT
22	199	109	121%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
23	192	42	28%	Schd. dys	SAFETY	Safety	ASPHALT
24	365	0	0%	Schd. dys	SAFETY	Safety	CONCRETE
25	81	-9	-10%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
26	310	0	0%	Fixed date	MINOR WIDENING	Widening	ASPHALT
27	44	14	47%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
28	20	0	0%	Schd. dys	SAFETY	Safety	ASPHALT
29	974	14	1%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
30	319	29	10%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
31	188	-12	-6%	Schd. dys	MAJOR WIDENING	Widening	ASPHALT
32	55	-5	-8%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	COMBINATION ASPHALT & CONCRETE
33	98	-2	-2%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
34	956	516	117%	Fixed date	BRIDGE REPLACEMENT	Bridge	ASPHALT
35	85	-15	-15%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	ASPHALT
36	260	-290	-53%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
37	46	-54	-54%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	CONCRETE
38	282	40	17%	Fixed date	BRIDGE RESTORE/REHAB	Bridge	COMBINATION ASPHALT & CONCRETE
39	50	0	0%	Schd. dys	ROUTINE MAINTENANCE	Rehabilitation & Maint.	COMBINATION ASPHALT & CONCRETE
40	29	-1	-3%	Schd. dys	SAFETY	Safety	ASPHALT
41	20	0	0%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	COMBINATION ASPHALT & CONCRETE
42	52	2	4%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
43	107	-3	-3%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
44	168	18	12%	Schd. dys	RECONSTRUCTION	New & Re-Construction	CONCRETE
45	402	-18	-4%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
46	92	27	42%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
47	45	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
48	64	-16	-20%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
49	199	63	46%	Fixed date	RESTORATION/REHAB	Rehabilitation & Maint.	CONCRETE
50	719	239	50%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
51	36	-14	-28%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
52	40	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
53	38	-2	-5%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	COMBINATION ASPHALT & CONCRETE
54	22	-8	-27%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
55	61	-9	-13%	Schd. dys	RESURFACING	Resurfacing	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
56	120	45	60%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
57	46	-1	-2%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
58	85	20	31%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
59	262	12	5%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
60	83	-50	-38%	Schd. dys	MINOR WIDENING	Widening	COMBINATION ASPHALT & CONCRETE
61	160	32	25%	Fixed date	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
62	13	-2	-13%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
63	40	0	0%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
64	123	-5	-4%	Schd. dys	RESURFACING	Resurfacing	CONCRETE
65	143	3	2%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	COMBINATION ASPHALT & CONCRETE
66	113	-2	-2%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
67	74	-11	-13%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
68	59	9	18%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
69	205	6	3%	Fixed date	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
70	69	11	19%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
71	303	78	35%	Fixed date	TRAFFIC SIGNALS	Traffic Signals	ASPHALT
72	45	15	50%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
73	38	-7	-16%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
74	43	-2	-4%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
75	69	-21	-23%	Schd. dys	SAFETY	Safety	ASPHALT
76	110	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
77	145	10	7%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
78	66	-9	-12%	Schd. dys	RESURFACING	Resurfacing	CONCRETE
79	174	-16	-8%	Fixed date	RESURFACING	Resurfacing	ASPHALT
80	489	41	9%	Fixed date	RECONSTRUCTION	New & Re-Construction	CONCRETE
81	64	4	7%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
82	27	-3	-10%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
83	243	74	44%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
84	168	23	16%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
85	110	34	45%	Fixed date	TRANS SYS MGMT (TSM)	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
86	97	-1	-1%	Fixed date	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
87	120	0	0%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	COMBINATION ASPHALT & CONCRETE

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
88	118	-2	-2%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	COMBINATION ASPHALT & CONCRETE
89	357	57	19%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
90	54	-6	-10%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
91	80	20	33%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
92	65	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
93	60	10	20%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
94	49	4	9%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
95	16	-4	-20%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
96	93	-47	-34%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
97	156	31	25%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
98	66	-14	-18%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
99	60	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
100	36	-1	-3%	Schd. dys	HAZARDOUS LOCATIONS	MISCELLANEOUS	ASPHALT
101	63	23	58%	Fixed date	SAFETY	Safety	ASPHALT
102	425	50	13%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	ASPHALT
103	63	13	26%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
104	181	61	51%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
105	56	6	12%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
106	82	7	9%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
107	136	16	13%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
108	394	15	4%	Fixed date	MINOR WIDENING	Widening	ASPHALT
109	22	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
110	87	12	16%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
111	266	26	11%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
112	37	2	6%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
113	135	30	29%	Schd. dys	SAFETY	Safety	ASPHALT
114	9	-1	-10%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	COMBINATION ASPHALT & CONCRETE
115	43	-2	-4%	Schd. dys	ROUTINE MAINTENANCE	Rehabilitation & Maint.	CONCRETE
116	235	0	0%	Fixed date	MINOR WIDENING	Widening	ASPHALT
117	52	3	6%	Fixed date	RESURFACING	Resurfacing	ASPHALT
118	79	-1	-1%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
119	11	-14	-56%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
120	71	-19	-21%	Fixed date	BRIDGE REPLACEMENT	Bridge	COMBINATION ASPHALT & CONCRETE
121	322	-10	-3%	Fixed date	MAJOR SURFACE TREATMENT	Surface Treatment	COMBINATION ASPHALT & CONCRETE
122	11	2	22%	Fixed date	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
123	225	45	25%	Schd. dys	MAJOR WIDENING	Widening	COMBINATION ASPHALT & CONCRETE
124	70	4	6%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
125	80	0	0%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	ASPHALT
126	160	-80	-33%	Schd. dys	BRIDGE REPLACEMENT	Bridge	ASPHALT
127	51	-49	-49%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	ASPHALT
128	155	0	0%	Fixed date	REST AREA	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
129	49	4	9%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
130	74	-26	-26%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
131	180	120	200%	Fixed date	MINOR WIDENING	Widening	COMBINATION ASPHALT & CONCRETE
132	76	20	36%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
133	156	6	4%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
134	99	-1	-1%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
135	147	-18	-11%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
136	119	-1	-1%	Schd. dys	SAFETY	Safety	ASPHALT
137	253	8	3%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
138	75	25	50%	Fixed date	BRIDGE REPLACEMENT	Bridge	ASPHALT
139	22	-3	-12%	Schd. dys	SAFETY	Safety	ASPHALT
140	257	8	3%	Fixed date	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
141	25	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
142	62	2	3%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
143	159	67	73%	Fixed date	RESTORATION/REHAB	Rehabilitation & Maint.	COMBINATION ASPHALT & CONCRETE
144	700	-305	-30%	Schd. dys	BRIDGE REPLACEMENT	Bridge	COMBINATION ASPHALT & CONCRETE
145	95	3	3%	Fixed date	MAJOR SURFACE TREATMENT	Surface Treatment	COMBINATION ASPHALT & CONCRETE
146	127	46	57%	Fixed date	TRAFFIC SIGNALS	Traffic Signals	ASPHALT
147	256	26	11%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
148	66	21	47%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	ASPHALT
149	168	-2	-1%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
150	35	-85	-71%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
151	33	3	10%	Schd. dys	SAFETY	Safety	ASPHALT
152	31	-14	-31%	Schd. dys	HAZARDOUS LOCATIONS	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
153	127	-3	-2%	Schd. dys	TRANS SYS MGMT (TSM)	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
154	235	40	21%	Schd. dys	SAFETY	Safety	ASPHALT
155	13	-7	-35%	Schd. dys	SAFETY	Safety	ASPHALT
156	650	450	225%	Fixed date	REST AREA	MISCELLANEOUS	ASPHALT
157	92	7	8%	Schd. dys	BRIDGE REPLACEMENT	Bridge	ASPHALT
158	38	-2	-5%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
159	29	4	16%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
160	75	15	25%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
161	115	65	130%	Schd. dys	HAZARDOUS LOCATIONS	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
162	514	92	22%	Schd. dys	BRIDGE REPLACEMENT	Bridge	COMBINATION ASPHALT & CONCRETE
163	36	-4	-10%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
164	38	-7	-16%	Schd. dys	RECONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
165	96	6	7%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
166	60	0	0%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	
167	47	-13	-22%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
168	334	34	11%	Schd. dys	BRIDGE REPLACEMENT	Bridge	COMBINATION ASPHALT & CONCRETE
169	64	4	7%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
170	47	-3	-6%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
171	59	9	18%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
172	23	3	15%	Schd. dys	HAZARDOUS LOCATIONS	MISCELLANEOUS	ASPHALT
173	49	-1	-2%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	CONCRETE
174	50	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
175	57	-8	-12%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
176	74	-6	-8%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
177	47	-3	-6%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
178	69	-1	-1%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
179	57	12	27%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
180	13	-4	-24%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
181	87	7	9%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
182	35	3	9%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
183	52	-8	-13%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
184	281	35	14%	Fixed date	RESURFACING	Resurfacing	ASPHALT
185	135	22	19%	Fixed date	BRIDGE RESTORE/REHAB	Bridge	COMBINATION ASPHALT & CONCRETE
186	96	-4	-4%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
187	20	-5	-20%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
188	102	17	20%	Schd. dys	ROUTINE MAINTENANCE	Rehabilitation & Maint.	CONCRETE
189	32	-8	-20%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
190	94	14	18%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
191	296	116	64%	Fixed date	BRIDGE REPLACEMENT	Bridge	ASPHALT
192	111	11	11%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
193	93	-7	-7%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
194	60	0	0%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
195	30	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
196	135	23	21%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
197	527	313	146%	Fixed date	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
198	25	0	0%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
199	62	0	0%	Fixed date	TRAFFIC SIGNALS	Traffic Signals	ASPHALT
200	100	0	0%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
201	283	194	218%	Fixed date	RESTORATION/REHAB	Rehabilitation & Maint.	ASPHALT
202	119	-1	-1%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	ASPHALT
203	106	16	18%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
204	90	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
205	53	8	18%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
206	10	-1	-9%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
207	121	36	42%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
208	65	5	8%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
209	60	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
210	35	0	0%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
211	175	100	133%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	CONCRETE
212	134	-50	-27%	Fixed date	RESURFACING	Resurfacing	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
213	88	8	10%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
214	64	-1	-2%	Schd. dys	RECONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
215	515	337	189%	Fixed date	BRIDGE REPLACEMENT	Bridge	COMBINATION ASPHALT & CONCRETE
216	90	0	0%	Schd. dys	BRIDGE REPLACEMENT	Bridge	COMBINATION ASPHALT & CONCRETE
217	245	31	14%	Fixed date	SAFETY	Safety	ASPHALT
218	90	0	0%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
219	155	35	29%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
220	25	-10	-29%	Schd. dys	HAZARDOUS LOCATIONS	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
221	218	40	22%	Fixed date	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
222	128	28	28%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
223	90	50	125%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
224	100	40	67%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
225	13	-2	-13%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
226	112	0	0%	Fixed date	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
227	115	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
228	100	0	0%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
229	13	-7	-35%	Schd. dys	SAFETY	Safety	ASPHALT
230	70	6	9%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
231	124	14	13%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
232	93	23	33%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
233	16	1	7%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
234	30	-10	-25%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
235	192	23	14%	Fixed date	RECONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
236	30	-5	-14%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
237	32	-3	-9%	Schd. dys	SAFETY	Safety	
238	234	54	30%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
239	102	2	2%	Schd. dys	BRIDGE REPLACEMENT	Bridge	ASPHALT
240	168	-47	-22%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	COMBINATION ASPHALT & CONCRETE
241	23	-17	-43%	Schd. dys	SAFETY	Safety	ASPHALT
242	197	1	1%	Fixed date	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
243	168	27	19%	Fixed date	HAZARDOUS LOCATIONS	MISCELLANEOUS	

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
244	561	171	44%	Schd. dys	BRIDGE REPLACEMENT	Bridge	COMBINATION ASPHALT & CONCRETE
245	68	12	21%	Schd. dys	PLANNING	MISCELLANEOUS	
246	178	68	62%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
247	84	-56	-40%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
248	412	-101	-20%	Fixed date	RECONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
249	145	2	1%	Fixed date	MINOR SURFACE TREATMENT	Surface Treatment	COMBINATION ASPHALT & CONCRETE
250	156	66	73%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	CONCRETE
251	10	0	0%	Schd. dys	TRANS SYS MGMT (TSM)	MISCELLANEOUS	
252	248	-6	-2%	Fixed date	SAFETY	Safety	ASPHALT
253	425	-15	-3%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
254	1178	261	28%	Fixed date	BRIDGE REPLACEMENT	Bridge	COMBINATION ASPHALT & CONCRETE
255	19	-6	-24%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
256	116	-4	-3%	Schd. dys	BRIDGE REPLACEMENT	Bridge	ASPHALT
257	65	20	44%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	CONCRETE
258	19	0	0%	Fixed date	MINOR SURFACE TREATMENT	Surface Treatment	COMBINATION ASPHALT & CONCRETE
259	33	0	0%	Fixed date	MINOR SURFACE TREATMENT	Surface Treatment	COMBINATION ASPHALT & CONCRETE
260	57	1	2%	Schd. dys	SAFETY	Safety	ASPHALT
261	86	61	244%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	
262	50	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
263	45	0	0%	Schd. dys	SAFETY	Safety	ASPHALT
264	117	52	80%	Fixed date	RESURFACING	Resurfacing	ASPHALT
265	215	15	8%	Schd. dys	RECONSTRUCTION	New & Re-Construction	CONCRETE
266	25	0	0%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	ASPHALT
267	100	0	0%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
268	264	144	120%	Schd. dys	RESURFACING	Resurfacing	CONCRETE
269	39	-1	-3%	Schd. dys	SAFETY	Safety	ASPHALT
270	52	7	16%	Schd. dys	HAZARDOUS LOCATIONS	MISCELLANEOUS	ASPHALT
271	33	-7	-18%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	CONCRETE
272	47	-18	-28%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	COMBINATION ASPHALT & CONCRETE

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
273	223	53	31%	Schd. dys	MAJOR WIDENING	Widening	ASPHALT
274	22	2	10%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
275	51	6	13%	Schd. dys	SAFETY	Safety	ASPHALT
276	70	25	56%	Schd. dys	SAFETY	Safety	ASPHALT
277	33	-2	-6%	Schd. dys	SAFETY	Safety	ASPHALT
278	268	28	12%	Schd. dys	RECONSTRUCTION	New & Re-Construction	CONCRETE
279	127	-13	-9%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
280	195	13	7%	Fixed date	HAZARDOUS LOCATIONS	MISCELLANEOUS	ASPHALT
281	209	-8	-4%	Fixed date	SAFETY	Safety	ASPHALT
282	225	11	5%	Fixed date	SAFETY	Safety	ASPHALT
283	37	-3	-8%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	ASPHALT
284	254	16	7%	Fixed date	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
285	150	30	25%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
286	174	-1	-1%	Schd. dys	BRIDGE REPLACEMENT	Bridge	ASPHALT
287	210	82	64%	Fixed date	HAZARDOUS LOCATIONS	MISCELLANEOUS	ASPHALT
288	10	-4	-29%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	ASPHALT
289	135	15	13%	Schd. dys	RECONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
290	85	-15	-15%	Schd. dys	SAFETY	Safety	ASPHALT
291	7	-8	-53%	Schd. dys	SAFETY	Safety	ASPHALT
292	102	12	13%	Schd. dys	BRIDGE REPLACEMENT	Bridge	ASPHALT
293	36	-4	-10%	Schd. dys	SAFETY	Safety	ASPHALT
294	60	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
295	136	-5	-4%	Fixed date	HAZARDOUS LOCATIONS	MISCELLANEOUS	ASPHALT
296	9	-6	-40%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
297	58	-2	-3%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
298	245	20	9%	Fixed date	RESURFACING	Resurfacing	ASPHALT
299	372	0	0%	Schd. dys	REST AREA	MISCELLANEOUS	ASPHALT
300	88	3	4%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	COMBINATION ASPHALT & CONCRETE
301	22	-13	-37%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
302	27	-3	-10%	Fixed date	RESTORATION/REHAB	Rehabilitation & Maint.	

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
303	32	-8	-20%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
304	65	1	2%	Fixed date	SAFETY	Safety	ASPHALT
305	33	-2	-6%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
306	30	0	0%	Schd. dys	SAFETY	Safety	ASPHALT
307	98	-2	-2%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
308	76	-9	-11%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
309	57	7	14%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
310	275	55	25%	Fixed date	RESURFACING	Resurfacing	ASPHALT
311	130	0	0%	Schd. dys	MAJOR WIDENING	Widening	ASPHALT
312	129	0	0%	Fixed date	SAFETY	Safety	ASPHALT
313	253	56	28%	Fixed date	BRIDGE RESTORE/REHAB	Bridge	COMBINATION ASPHALT & CONCRETE
314	96	-14	-13%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
315	110	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
316	65	5	8%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
317	19	-16	-46%	Schd. dys	SAFETY	Safety	ASPHALT
318	62	37	148%	Fixed date	MINOR SURFACE TREATMENT	Surface Treatment	
319	316	77	32%	Schd. dys	MAJOR WIDENING	Widening	ASPHALT
320	95	11	13%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
321	151	-84	-36%	Fixed date	SAFETY	Safety	ASPHALT
322	294	98	50%	Fixed date	RESURFACING	Resurfacing	ASPHALT
323	475	190	67%	Fixed date	RESURFACING	Resurfacing	ASPHALT
324	270	90	50%	Fixed date	TRANS SYS MGMT (TSM)	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
325	102	2	2%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
326	214	78	57%	Fixed date	SAFETY	Safety	ASPHALT
327	42	-3	-7%	Schd. dys	SAFETY	Safety	ASPHALT
328	87	12	16%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
329	90	10	13%	Schd. dys	BRIDGE REPLACEMENT	Bridge	ASPHALT
330	72	2	3%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
331	69	-1	-1%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
332	89	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
333	47	-13	-22%	Schd. dys	SAFETY	Safety	ASPHALT
334	204	0	0%	Fixed date	RESURFACING	Resurfacing	ASPHALT
335	88	8	10%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	ASPHALT
336	96	-4	-4%	Schd. dys	SAFETY	Safety	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
337	40	0	0%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	COMBINATION ASPHALT & CONCRETE
338	158	0	0%	Fixed date	RESURFACING	Resurfacing	ASPHALT
339	119	-14	-11%	Fixed date	HAZARDOUS LOCATIONS	MISCELLANEOUS	ASPHALT
340	250	70	39%	Fixed date	RESURFACING	Resurfacing	ASPHALT
341	161	96	148%	Fixed date	RESURFACING	Resurfacing	ASPHALT
342	196	-1	-1%	Fixed date	RESURFACING	Resurfacing	ASPHALT
343	86	-14	-14%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
344	50	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
345	25	0	0%	Schd. dys	SAFETY	Safety	ASPHALT
346	350	50	17%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
347	29	-6	-17%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
348	113	13	13%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	ASPHALT
349	54	14	35%	Schd. dys	SAFETY	Safety	ASPHALT
350	25	-5	-17%	Schd. dys	SAFETY	Safety	ASPHALT
351	147	-38	-21%	Fixed date	TRAFFIC SIGNALS	Traffic Signals	ASPHALT
352	55	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
353	45	20	80%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	ASPHALT
354	85	10	13%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
355	60	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
356	45	0	0%	Schd. dys	RESURFACING	Resurfacing	CONCRETE
357	44	-1	-2%	Schd. dys	SAFETY	Safety	ASPHALT
358	19	-6	-24%	Schd. dys	SAFETY	Safety	ASPHALT
359	50	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
360	62	-3	-5%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
361	70	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
362	354	-9	-2%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	COMBINATION ASPHALT & CONCRETE
363	260	10	4%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
364	15	0	0%	Schd. dys	SAFETY	Safety	ASPHALT
365	82	22	37%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
366	331	-82	-20%	Fixed date	BRIDGE REPLACEMENT	Bridge	
367	14	-11	-44%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
368	29	9	45%	Schd. dys	SAFETY	Safety	
369	217	99	84%	Fixed date	RESURFACING	Resurfacing	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
370	108	8	8%	Schd. dys	RESURFACING	Resurfacing	
371	432	20	5%	Schd. dys	RECONSTRUCTION	New & Re-Construction	CONCRETE
372	59	9	18%	Fixed date	MINOR WIDENING	Widening	
373	185	5	3%	Schd. dys	RECONSTRUCTION	New & Re-Construction	CONCRETE
374	134	14	12%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
375	50	0	0%	Schd. dys	SAFETY	Safety	ASPHALT
376	39	-6	-13%	Schd. dys	TRANS SYS MGMT (TSM)	MISCELLANEOUS	
377	471	14	3%	Fixed date	BRIDGE REPLACEMENT	Bridge	ASPHALT
378	124	34	38%	Schd. dys	BRIDGE REPLACEMENT	Bridge	ASPHALT
379	47	-3	-6%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
380	102	-194	-66%	Fixed date	RESTORATION/REHAB	Rehabilitation & Maint.	ASPHALT
381	297	-63	-18%	Schd. dys	MAJOR WIDENING	Widening	ASPHALT
382	49	-1	-2%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	ASPHALT
383	332	-48	-13%	Schd. dys	RECONSTRUCTION	New & Re-Construction	CONCRETE
384	29	-6	-17%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	
385	78	15	24%	Schd. dys	SAFETY	Safety	
386	283	-57	-17%	Schd. dys	REST AREA	MISCELLANEOUS	ASPHALT
387	334	32	11%	Fixed date	SAFETY	Safety	ASPHALT
388	36	-24	-40%	Schd. dys	HAZARDOUS LOCATIONS	MISCELLANEOUS	
389	417	333	396%	Fixed date	MISCELLANEOUS	MISCELLANEOUS	
390	75	0	0%	Schd. dys	SAFETY	Safety	
391	745	55	8%	Schd. dys	RECONSTRUCTION	New & Re-Construction	
392	29	-61	-68%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	ASPHALT
393	159	9	6%	Schd. dys	BRIDGE REPLACEMENT	Bridge	COMBINATION ASPHALT & CONCRETE
394	94	19	25%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	COMBINATION ASPHALT & CONCRETE
395	12	-3	-20%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
396	446	51	13%	Schd. dys	MAJOR WIDENING	Widening	CONCRETE
397	56	6	12%	Schd. dys	HAZARDOUS LOCATIONS	MISCELLANEOUS	

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
398	98	29	42%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
399	179	19	12%	Schd. dys	BRIDGE REPLACEMENT	Bridge	ASPHALT
400	743	587	376%	Fixed date	MISCELLANEOUS	MISCELLANEOUS	ASPHALT
401	39	-1	-3%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	
402	818	125	18%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
403	39	12	44%	Schd. dys	LANDSCAPING	MISCELLANEOUS	
404	170	0	0%	Schd. dys	SAFETY	Safety	ASPHALT
405	360	-1	0%	Fixed date	BRIDGE REPLACEMENT	Bridge	ASPHALT
406	243	0	0%	Fixed date	BRIDGE REPLACEMENT	Bridge	ASPHALT
407	104	7	7%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	ASPHALT
408	93	-2	-2%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	ASPHALT
409	66	6	10%	Schd. dys	SAFETY	Safety	ASPHALT
410	1181	511	76%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
411	220	0	0%	Schd. dys	BRIDGE REPLACEMENT	Bridge	COMBINATION ASPHALT & CONCRETE
412	96	11	13%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
413	70	0	0%	Schd. dys	SAFETY	Safety	
414	48	-2	-4%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	ASPHALT
415	51	-9	-15%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
416	59	38	181%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	ASPHALT
417	53	-12	-18%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
418	296	-12	-4%	Fixed date	BRIDGE REPLACEMENT	Bridge	ASPHALT
419	6	-14	-70%	Schd. dys	ROUTINE MAINTENANCE	Rehabilitation & Maint.	ASPHALT
420	105	20	24%	Schd. dys	ENHANCEMENT	MISCELLANEOUS	ASPHALT
421	44	-6	-12%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
422	18	-12	-40%	Schd. dys	SAFETY	Safety	ASPHALT
423	549	-101	-16%	Schd. dys	RECONSTRUCTION	New & Re-Construction	CONCRETE
424	384	-60	-14%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
425	158	38	32%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
426	98	23	31%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
427	211	-7	-3%	Fixed date	RESURFACING	Resurfacing	
428	9	-11	-55%	Schd. dys	RESURFACING	Resurfacing	
429	90	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
430	94	14	18%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
431	150	50	50%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	ASPHALT
432	269	0	0%	Fixed date	RESURFACING	Resurfacing	ASPHALT
433	212	92	77%	Schd. dys	RESURFACING	Resurfacing	
434	53	-22	-29%	Schd. dys	RESURFACING	Resurfacing	
435	65	-3	-4%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
436	69	17	33%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
437	82	22	37%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
438	103	3	3%	Schd. dys	RESURFACING	Resurfacing	
439	40	0	0%	Schd. dys	SAFETY	Safety	
440	147	3	2%	Schd. dys	RESURFACING	Resurfacing	
441	94	4	4%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
442	64	-36	-36%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	
443	56	4	8%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
444	40	0	0%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	
445	34	-2	-6%	Schd. dys	HAZARDOUS LOCATIONS	MISCELLANEOUS	ASPHALT
446	16	1	7%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
447	158	1	1%	Fixed date	RESURFACING	Resurfacing	
448	25	5	25%	Schd. dys	SAFETY	Safety	ASPHALT
449	45	0	0%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	ASPHALT
450	65	-5	-7%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
451	227	56	33%	Fixed date	RESURFACING	Resurfacing	
452	424	382	910%	Fixed date	SAFETY	Safety	ASPHALT
453	85	35	70%	Schd. dys	RESURFACING	Resurfacing	
454	74	-1	-1%	Schd. dys	SAFETY	Safety	ASPHALT
455	370	90	32%	Schd. dys	SAFETY	Safety	
456	26	-9	-26%	Schd. dys	SAFETY	Safety	ASPHALT
457	175	55	46%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
458	68	3	5%	Schd. dys	RESURFACING	Resurfacing	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
459	199	-5	-2%	Fixed date	RESURFACING	Resurfacing	ASPHALT
460	75	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
461	70	10	17%	Schd. dys	MAJOR WIDENING	Widening	ASPHALT
462	50	-4	-7%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	ASPHALT
463	69	-1	-1%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
464	38	8	27%	Schd. dys	SAFETY	Safety	
465	40	0	0%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
466	31	1	3%	Schd. dys	SAFETY	Safety	
467	250	38	18%	Fixed date	MISCELLANEOUS	MISCELLANEOUS	ASPHALT
468	148	-63	-30%	Fixed date	RESURFACING	Resurfacing	
469	35	-5	-13%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
470	59	14	31%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
471	80	0	0%	Schd. dys	SAFETY	Safety	
472	115	5	5%	Schd. dys	RECONSTRUCTION	New & Re-Construction	
473	60	15	33%	Schd. dys	SAFETY	Safety	ASPHALT
474	126	-28	-18%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
475	97	4	4%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
476	6	0	0%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
477	4	-6	-60%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
478	7	-5	-42%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
479	58	-2	-3%	Schd. dys	SAFETY	Safety	ASPHALT
480	407	356	698%	Fixed date	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
481	88	18	26%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
482	29	-1	-3%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
483	52	2	4%	Schd. dys	SAFETY	Safety	
484	80	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
485	46	-4	-8%	Schd. dys	SAFETY	Safety	ASPHALT
486	68	28	70%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
487	140	0	0%	Schd. dys	BRIDGE REPLACEMENT	Bridge	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
488	92	0	0%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	COMBINATION ASPHALT & CONCRETE
489	57	-8	-12%	Schd. dys	SAFETY	Safety	ASPHALT
490	62	12	24%	Schd. dys	SAFETY	Safety	
491	446	376	537%	Fixed date	MINOR SURFACE TREATMENT	Surface Treatment	COMBINATION ASPHALT & CONCRETE
492	85	-15	-15%	Schd. dys	RESURFACING	Resurfacing	
493	74	14	23%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	ASPHALT
494	119	29	32%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
495	465	151	48%	Schd. dys	BRIDGE REPLACEMENT	Bridge	ASPHALT
496	142	2	1%	Schd. dys	MINOR WIDENING	Widening	
497	62	2	3%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
498	175	55	46%	Schd. dys	RECONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
499	36	6	20%	Schd. dys	SAFETY	Safety	
500	662	0	0%	Fixed date	BRIDGE REPLACEMENT	Bridge	COMBINATION ASPHALT & CONCRETE
501	33	-12	-27%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	ASPHALT
502	100	30	43%	Fixed date	SAFETY	Safety	ASPHALT
503	122	77	171%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
504	70	0	0%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	ASPHALT
505	980	163	20%	Fixed date	MAJOR WIDENING	Widening	CONCRETE
506	430	0	0%	Fixed date	MINOR WIDENING	Widening	ASPHALT
507	457	31	7%	Fixed date	MISCELLANEOUS	MISCELLANEOUS	
508	422	31	8%	Fixed date	MISCELLANEOUS	MISCELLANEOUS	CONCRETE
509	100	-10	-9%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
510	303	251	483%	Fixed date	SAFETY	Safety	ASPHALT
511	20	0	0%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	
512	136	36	36%	Schd. dys	RECONSTRUCTION	New & Re-Construction	
513	208	-1	0%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
515	67	2	3%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	
516	22	-13	-37%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
517	224	55	33%	Fixed date	SAFETY	Safety	
518	141	75	114%	Fixed date	SAFETY	Safety	CONCRETE

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
519	33	3	10%	Schd. dys	SAFETY	Safety	
520	442	24	6%	Fixed date	RECONSTRUCTION	New & Re-Construction	
521	1290	12	1%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
522	28	3	12%	Schd. dys	SAFETY	Safety	
523	54	24	80%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
524	283	65	30%	Fixed date	SAFETY	Safety	ASPHALT
525	73	13	22%	Schd. dys	SAFETY	Safety	
526	90	-60	-40%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
527	106	22	26%	Fixed date	MISCELLANEOUS	MISCELLANEOUS	
528	88	-2	-2%	Schd. dys	REST AREA	MISCELLANEOUS	
529	18	-12	-40%	Schd. dys	RESURFACING	Resurfacing	
530	14	-6	-30%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	ASPHALT
531	65	0	0%	Schd. dys	SAFETY	Safety	
532	98	-2	-2%	Schd. dys	SAFETY	Safety	
533	9	-1	-10%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	ASPHALT
534	131	-69	-35%	Schd. dys	REST AREA	MISCELLANEOUS	
535	53	13	33%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	
536	49	9	23%	Schd. dys	SAFETY	Safety	ASPHALT
537	49	-6	-11%	Schd. dys	RESURFACING	Resurfacing	
538	269	-8	-3%	Fixed date	RESURFACING	Resurfacing	
539	213	-7	-3%	Schd. dys	ROUTINE MAINTENANCE	Rehabilitation & Maint.	
540	105	0	0%	Schd. dys	RESURFACING	Resurfacing	
541	866	439	103%	Fixed date	RECONSTRUCTION	New & Re-Construction	
542	17	-13	-43%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
543	111	11	11%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
544	85	25	42%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
545	66	-4	-6%	Fixed date	BRIDGE RESTORE/REHAB	Bridge	CONCRETE
546	364	-26	-7%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
547	581	324	126%	Fixed date	RESTORATION/REHAB	Rehabilitation & Maint.	
548	83	3	4%	Schd. dys	RESURFACING	Resurfacing	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
549	1065	495	87%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	
550	125	45	56%	Schd. dys	RESURFACING	Resurfacing	
551	38	-2	-5%	Schd. dys	SAFETY	Safety	COMBINATION ASPHALT & CONCRETE
552	45	8	22%	Schd. dys	SAFETY	Safety	
553	918	742	422%	Fixed date	RESURFACING	Resurfacing	CONCRETE
554	189	82	77%	Fixed date	RESURFACING	Resurfacing	
555	80	0	0%	Schd. dys	RESURFACING	Resurfacing	
556	8	-2	-20%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	
557	68	0	0%	Fixed date	MINOR WIDENING	Widening	ASPHALT
558	12	-18	-60%	Schd. dys	SAFETY	Safety	ASPHALT
559	75	7	10%	Fixed date	SAFETY	Safety	
560	69	9	15%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
561	75	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
562	13	-4	-24%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
563	58	-2	-3%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
564	60	6	11%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
565	42	2	5%	Schd. dys	SAFETY	Safety	
566	88	-2	-2%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
567	38	-7	-16%	Schd. dys	RESURFACING	Resurfacing	
568	19	-2	-10%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	ASPHALT
569	61	1	2%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
570	86	26	43%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
571	118	38	48%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
572	5	-5	-50%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	
573	150	0	0%	Schd. dys	RESURFACING	Resurfacing	
574	283	46	19%	Fixed date	RESURFACING	Resurfacing	ASPHALT
575	411	170	71%	Fixed date	RECONSTRUCTION	New & Re-Construction	ASPHALT
576	54	6	13%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	ASPHALT
577	470	267	132%	Fixed date	TRANS SYS MGMT (TSM)	MISCELLANEOUS	ASPHALT
578	95	-5	-5%	Schd. dys	RESURFACING	Resurfacing	
579	60	0	0%	Schd. dys	RESURFACING	Resurfacing	

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
580	78	3	4%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
581	29	1	4%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
582	18	-2	-10%	Schd. dys	SAFETY	Safety	
583	28	3	12%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	ASPHALT
584	60	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
585	489	-1	0%	Fixed date	RESURFACING	Resurfacing	
586	215	117	119%	Fixed date	RESURFACING	Resurfacing	ASPHALT
587	116	24	26%	Schd. dys	RESURFACING	Resurfacing	
588	429	35	9%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
589	45	0	0%	Schd. dys	SAFETY	Safety	ASPHALT
590	88	2	2%	Schd. dys	MAJOR WIDENING	Widening	ASPHALT
591	13	-7	-35%	Schd. dys	MINOR SURFACE TREATMENT	Surface Treatment	
592	53	-7	-12%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
593	480	288	150%	Fixed date	RESTORATION/REHAB	Rehabilitation & Maint.	ASPHALT
594	50	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
595	811	232	40%	Fixed date	RECONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
596	1298	337	35%	Fixed date	NEW CONSTRUCTION	New & Re-Construction	
597	28	-7	-20%	Schd. dys	SAFETY	Safety	
598	213	85	66%	Fixed date	SAFETY	Safety	
599	178	-2	-1%	Schd. dys	RECONSTRUCTION	New & Re-Construction	
600	113	13	13%	Schd. dys	SAFETY	Safety	
601	49	-1	-2%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
602	83	3	4%	Schd. dys	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
603	521	134	35%	Fixed date	NEW CONSTRUCTION	New & Re-Construction	ASPHALT
604	104	54	108%	Fixed date	RESURFACING	Resurfacing	ASPHALT
605	55	-5	-8%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
606	18	-7	-28%	Schd. dys	SAFETY	Safety	
607	150	0	0%	Schd. dys	MAJOR WIDENING	Widening	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
608	50	5	11%	Schd. dys	SAFETY	Safety	
609	40	0	0%	Schd. dys	SAFETY	Safety	ASPHALT
610	73	20	38%	Fixed date	RESURFACING	Resurfacing	
611	88	-2	-2%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	CONCRETE
612	28	3	12%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
613	86	26	43%	Schd. dys	SAFETY	Safety	ASPHALT
614	101	1	1%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
615	500	13	3%	Fixed date	RECONSTRUCTION	New & Re-Construction	ASPHALT
616	39	-71	-65%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	ASPHALT
617	127	-3	-2%	Schd. dys	RESURFACING	Resurfacing	
618	451	228	102%	Fixed date	SAFETY	Safety	
619	39	4	11%	Schd. dys	SAFETY	Safety	ASPHALT
620	32	0	0%	Schd. dys	SAFETY	Safety	
621	34	-13	-28%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	
622	35	10	40%	Schd. dys	SAFETY	Safety	
623	40	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
624	76	36	90%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
625	49	-1	-2%	Schd. dys	SAFETY	Safety	
626	152	-18	-11%	Fixed date	TRAFFIC SIGNALS	Traffic Signals	
627	80	20	33%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	
628	47	2	4%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
629	141	22	18%	Fixed date	SAFETY	Safety	
630	40	-13	-25%	Fixed date	RESTORATION/REHAB	Rehabilitation & Maint.	ASPHALT
631	48	-2	-4%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
632	254	7	3%	Fixed date	RESURFACING	Resurfacing	ASPHALT
633	100	5	5%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	
634	16	-9	-36%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
635	75	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
636	50	-30	-38%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	CONCRETE
637	175	18	11%	Fixed date	SAFETY	Safety	
638	55	5	10%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
639	65	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
640	100	10	11%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	
641	399	252	171%	Fixed date	TRAFFIC SIGNALS	Traffic Signals	
642	65	10	18%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	
643	39	-1	-3%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
644	35	10	40%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
645	44	9	26%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
646	205	28	16%	Schd. dys	SAFETY	Safety	
647	77	22	40%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	
648	64	6	10%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	CONCRETE
649	8	-7	-47%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
650	72	-18	-20%	Schd. dys	TRANS SYS MGMT (TSM)	MISCELLANEOUS	
651	89	14	19%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	
652	93	23	33%	Schd. dys	TRAFFIC SIGNALS	Traffic Signals	
653	128	12	10%	Fixed date	Bridge	Bridge	
654	27	-2	-7%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	
655	49	-6	-11%	Schd. dys	SAFETY	Safety	
656	108	13	14%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
657	111	1	1%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	
658	96	-4	-4%	Schd. dys	SAFETY	Safety	

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
659	214	129	152%	Fixed date	NEW CONSTRUCTION	New & Re-Construction	ASPHALT
660	77	-3	-4%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
661	86	13	18%	Fixed date	NEW CONSTRUCTION	New & Re-Construction	ASPHALT
662	39	-1	-3%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
663	69	34	97%	Schd. dys	SAFETY	Safety	
664	241	24	11%	Fixed date	BRIDGE REPLACEMENT	Bridge	
665	82	2	3%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	CONCRETE
666	145	-47	-24%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
667	50	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
668	110	-3	-3%	Fixed date	MINOR WIDENING	Widening	COMBINATION ASPHALT & CONCRETE
669	505	-20	-4%	Fixed date	SAFETY	Safety	
670	294	144	96%	Fixed date	BRIDGE REPLACEMENT	Bridge	
671	65	-5	-7%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	
672	104	14	16%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	
673	56	-4	-7%	Schd. dys	SAFETY	Safety	
674	33	-7	-18%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
675	107	-3	-3%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
676	65	-25	-28%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	CONCRETE
677	38	8	27%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
678	99	33	50%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
679	67	-3	-4%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
680	79	14	22%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
681	25	-5	-17%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
682	138	15	12%	Fixed date	SAFETY	Safety	ASPHALT
683	94	-1	-1%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
684	119	19	19%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	CONCRETE
685	50	0	0%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
686	58	16	38%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
687	107	7	7%	Schd. dys	SAFETY	Safety	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
688	171	-29	-15%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
689	137	2	1%	Schd. dys	SAFETY	Safety	
690	165	5	3%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	ASPHALT
691	58	-12	-17%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
692	207	137	196%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	CONCRETE
693	225	138	159%	Fixed date	RESURFACING	Resurfacing	ASPHALT
694	32	-8	-20%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
695	462	73	19%	Fixed date	BRIDGE REPLACEMENT	Bridge	
696	79	4	5%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
697	84	-8	-9%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
698	96	-4	-4%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
699	99	29	41%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
700	160	9	6%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	
701	80	3	4%	Schd. dys	SAFETY	Safety	
702	52	-3	-5%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
703	62	-3	-5%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
704	145	20	16%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	CONCRETE
705	177	97	121%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
706	89	14	19%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	
707	40	0	0%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
708	103	13	14%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
709	120	-5	-4%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	CONCRETE
710	54	-27	-33%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
711	297	21	8%	Schd. dys	MAJOR SURFACE TREATMENT	Surface Treatment	CONCRETE
712	233	158	211%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
713	415	62	18%	Fixed date	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
714	140	27	24%	Fixed date	RESURFACING	Resurfacing	ASPHALT
715	456	-7	-2%	Fixed date	BRIDGE REPLACEMENT	Bridge	
716	119	13	12%	Fixed date	RESURFACING	Resurfacing	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
717	290	0	0%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
718	124	14	13%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	
719	67	2	3%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
720	106	-7	-6%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
721	167	16	11%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
722	313	48	18%	Fixed date	BRIDGE REPLACEMENT	Bridge	
723	110	47	75%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
724	122	2	2%	Schd. dys	HAZARDOUS LOCATIONS	MISCELLANEOUS	
725	106	32	43%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
726	289	-3	-1%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	COMBINATION ASPHALT & CONCRETE
727	116	6	5%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
728	312	25	9%	Fixed date	RECONSTRUCTION	New & Re-Construction	ASPHALT
729	88	18	26%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
730	129	-1	-1%	Fixed date	RECONSTRUCTION	New & Re-Construction	ASPHALT
731	122	39	47%	Schd. dys	RECONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
732	67	2	3%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
733	146	36	33%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
734	64	-6	-9%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
735	196	16	9%	Schd. dys	RECONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
736	197	-11	-5%	Fixed date	RECONSTRUCTION	New & Re-Construction	ASPHALT
737	220	0	0%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	CONCRETE
738	314	5	2%	Fixed date	BRIDGE REPLACEMENT	Bridge	
739	76	6	9%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
740	88	8	10%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
741	96	-17	-15%	Fixed date	RESURFACING	Resurfacing	ASPHALT
742	561	107	24%	Fixed date	NEW CONSTRUCTION	New & Re-Construction	ASPHALT

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
743	206	0	0%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
744	207	-31	-13%	Fixed date	NEW CONSTRUCTION	New & Re-Construction	COMBINATION ASPHALT & CONCRETE
745	410	-12	-3%	Fixed date	RECONSTRUCTION	New & Re-Construction	CONCRETE
746	133	-2	-1%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
747	97	2	2%	Schd. dys	RESURFACING	Resurfacing	CONCRETE
748	144	-11	-7%	Schd. dys	MAJOR WIDENING	Widening	CONCRETE
749	100	15	18%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
750	225	0	0%	Schd. dys	RECONSTRUCTION	New & Re-Construction	CONCRETE
751	190	30	19%	Schd. dys	RECONSTRUCTION	New & Re-Construction	ASPHALT
752	466	200	75%	Fixed date	RESURFACING	Resurfacing	COMBINATION ASPHALT & CONCRETE
753	519	-21	-4%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
754	237	-3	-1%	Fixed date	MAJOR WIDENING	Widening	ASPHALT
755	119	-11	-8%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
756	501	0	0%	Fixed date	RECONSTRUCTION	New & Re-Construction	ASPHALT
757	154	11	8%	Fixed date	RESURFACING	Resurfacing	ASPHALT
758	478	113	31%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
759	476	305	178%	Fixed date	MAJOR SURFACE TREATMENT	Surface Treatment	ASPHALT
760	282	-3	-1%	Fixed date	RECONSTRUCTION	New & Re-Construction	ASPHALT
761	337	12	4%	Schd. dys	MINOR WIDENING	Widening	ASPHALT
762	484	43	10%	Fixed date	MAJOR WIDENING	Widening	ASPHALT
763	265	10	4%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
764	298	-102	-26%	Schd. dys	BRIDGE REPLACEMENT	Bridge	
765	127	-33	-21%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
766	184	76	70%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
767	205	5	3%	Schd. dys	RECONSTRUCTION	New & Re-Construction	CONCRETE

Proj. ID.	Final Time Charged	Schedule variation	Δ T	Schd. Type	Work Type	Modified Scope of Wk.	Highway Type
768	153	-4	-3%	Schd. dys	RESURFACING	Resurfacing	ASPHALT
769	148	18	14%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	CONCRETE
770	210	-30	-13%	Schd. dys	RECONSTRUCTION	New & Re-Construction	CONCRETE
771	216	14	7%	Fixed date	RECONSTRUCTION	New & Re-Construction	ASPHALT
772	387	30	8%	Schd. dys	RESURFACING	Resurfacing	CONCRETE
773	156	6	4%	Schd. dys	MAJOR WIDENING	Widening	CONCRETE
774	153	18	13%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	CONCRETE
775	269	9	3%	Schd. dys	MAJOR WIDENING	Widening	CONCRETE
776	312	22	8%	Schd. dys	MISCELLANEOUS	MISCELLANEOUS	CONCRETE
777	364	14	4%	Schd. dys	NEW CONSTRUCTION	New & Re-Construction	CONCRETE
778	407	-33	-8%	Schd. dys	RECONSTRUCTION	New & Re-Construction	CONCRETE
779	421	36	9%	Schd. dys	MAJOR WIDENING	Widening	CONCRETE
780	671	41	7%	Schd. dys	BRIDGE RESTORE/REHAB	Bridge	
781	508	108	27%	Schd. dys	RESTORATION/REHAB	Rehabilitation & Maint.	COMBINATION ASPHALT & CONCRETE

Proj. ID.	Other
608	
609	
610	
611	
612	
613	
614	
615	
616	
617	
618	
619	
620	
621	
622	
623	
624	
625	
626	
627	
628	
629	hazardous location (Rock Mitigation)
630	
631	roundabout
632	
633	
634	
635	

Proj. ID.	Other
636	
637	deer fence
638	
639	
640	Signalized Intersection which includes Concrete Box Culvert, drainage, embankment, HMA, ABC, signing, striping, erosion control, and seeding.
641	
642	
643	
644	
645	
646	Bridge rail replacement
647	Interchange improvement
648	
649	
650	electronic signs, closed circuit cameras, power and communication systems) to provide real-time information during inclement weather
651	
652	Fiber optic
653	new
654	
655	Bridge anti-icing system
656	
657	
658	

Proj. ID.	Other
659	Truck Parking
660	
661	
662	
663	resurfacing too
664	
665	
666	
667	
668	
669	hazardous location (Deer Fence)
670	
671	Sound Barriers
672	
673	Guardrail
674	
675	
676	
677	
678	
679	
680	
681	
682	
683	
684	
685	
686	
687	(Shoulders, Curb & gutter)

Proj. ID.	Other
688	
689	TRAFFIC SIGNALS
690	MISCELLANEOUS
691	MISCELLANEOUS
692	
693	
694	
695	
696	
697	
698	
699	
700	Culvert / Miscellaneous
701	Traffic Signals
702	
703	rotomilling
704	
705	
706	asphalt
707	
708	
709	
710	
711	
712	
713	
714	
715	
716	

Proj. ID.	Other
717	
718	
719	
720	
721	
722	
723	
724	
725	
726	
727	
728	
729	
730	resurfacing
731	asphalt
732	FDR
733	
734	
735	
736	FDR
737	
738	
739	
740	
741	
742	MISCELLANEOUS

Proj. ID.	Other
743	
744	
745	
746	
747	
748	
749	
750	
751	
752	247000 Delay costs
753	
754	MISCELLANEOUS
755	
756	
757	
758	
759	
760	
761	MISCELLANEOUS
762	
763	
764	
765	
766	
767	

Proj. ID.	Other
768	
769	COMBINATION ASPHALT & CONCRETE
770	
771	
772	MISCELLANEOUS
773	
774	
775	COMBINATION ASPHALT & CONCRETE
776	
777	
778	
779	
780	
781	

APPENDIX D – FREQUENCY AND PERCENTAGE ANALYSIS CHARTS

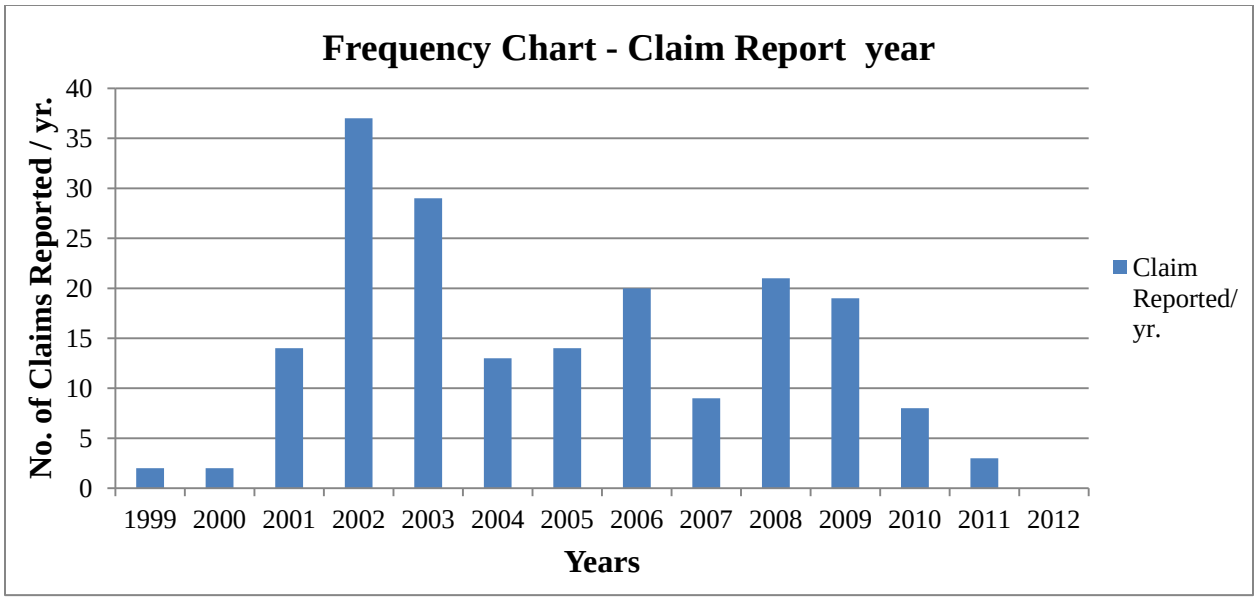


Figure 21

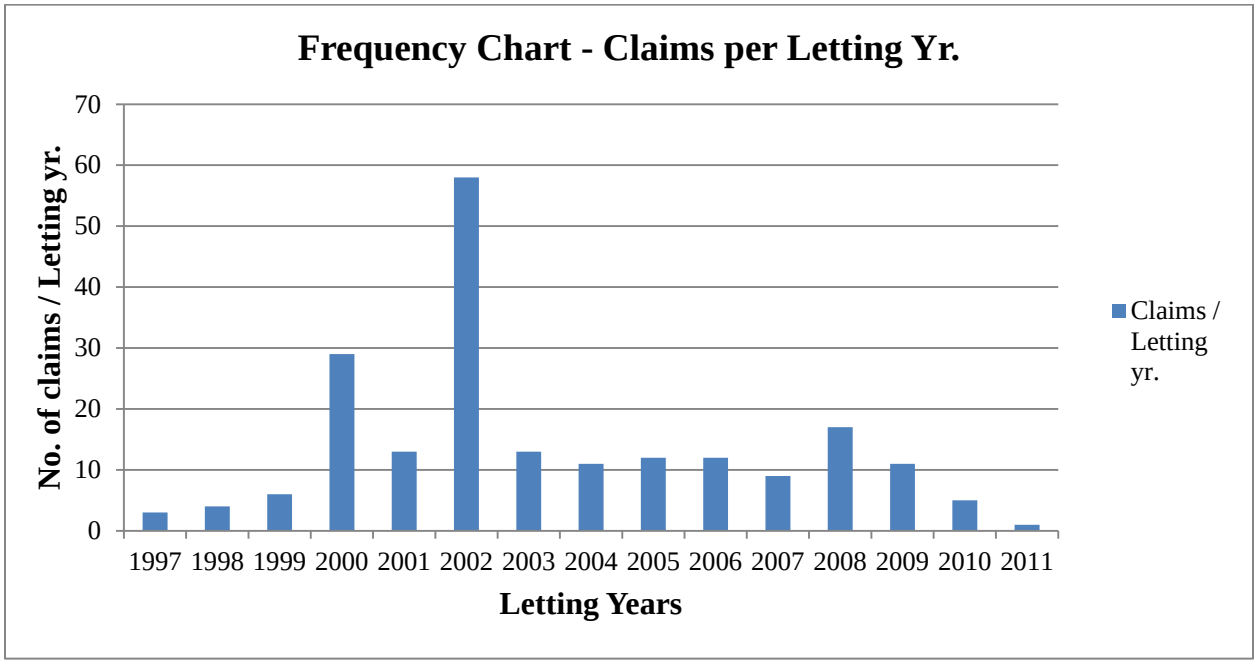


Figure 22

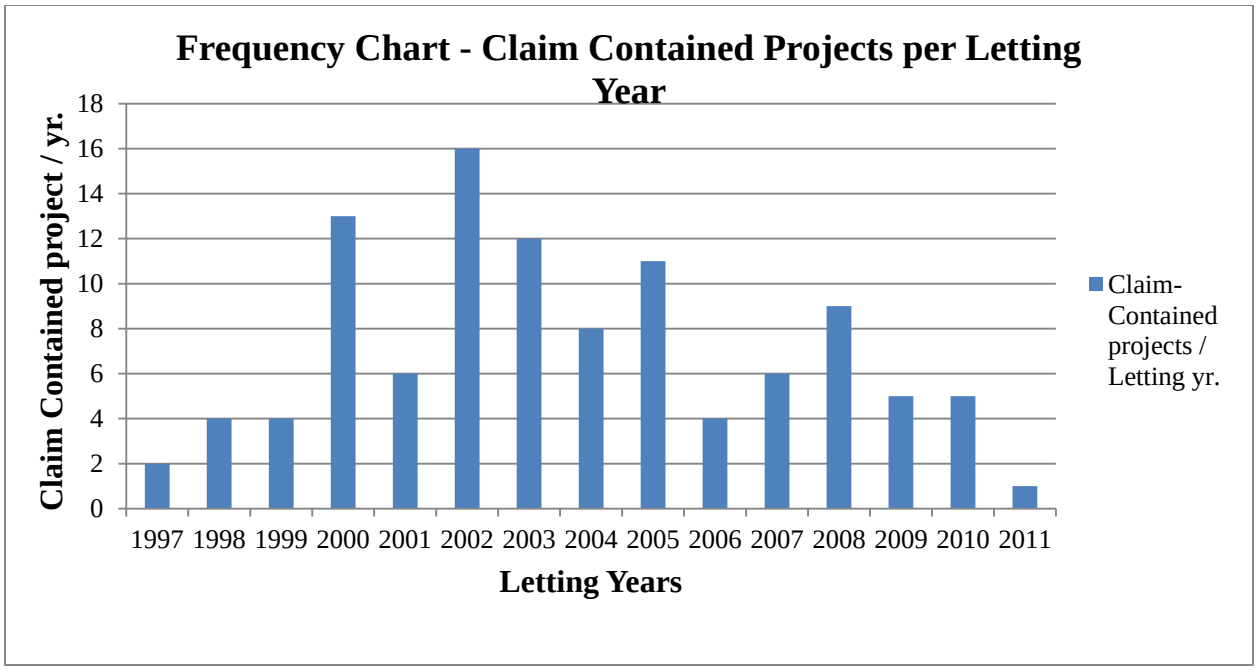


Figure 23

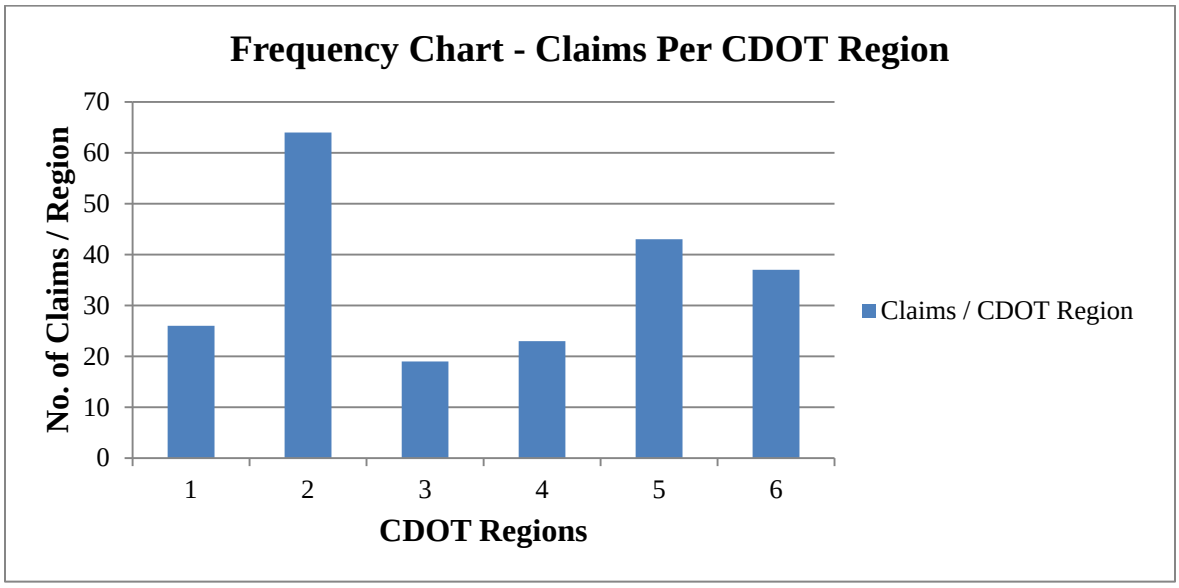


Figure 24

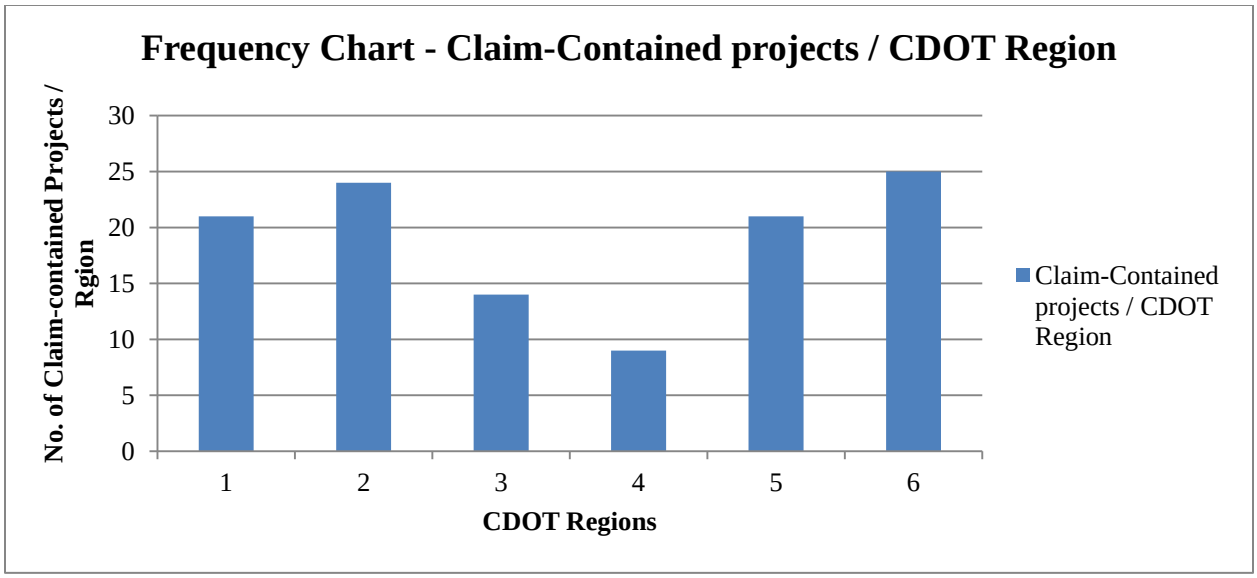


Figure 25

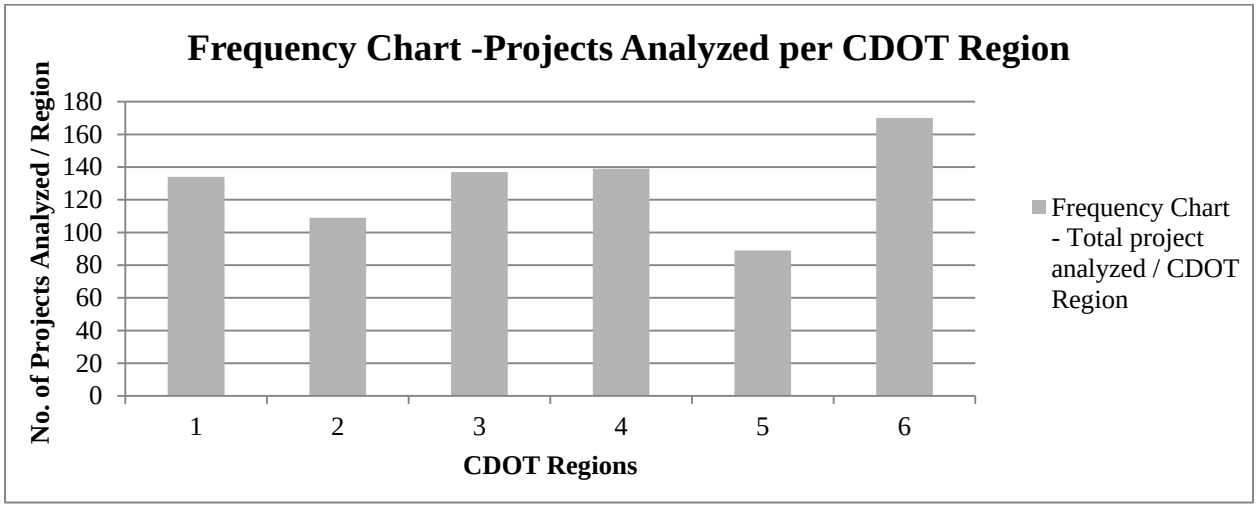


Figure 26

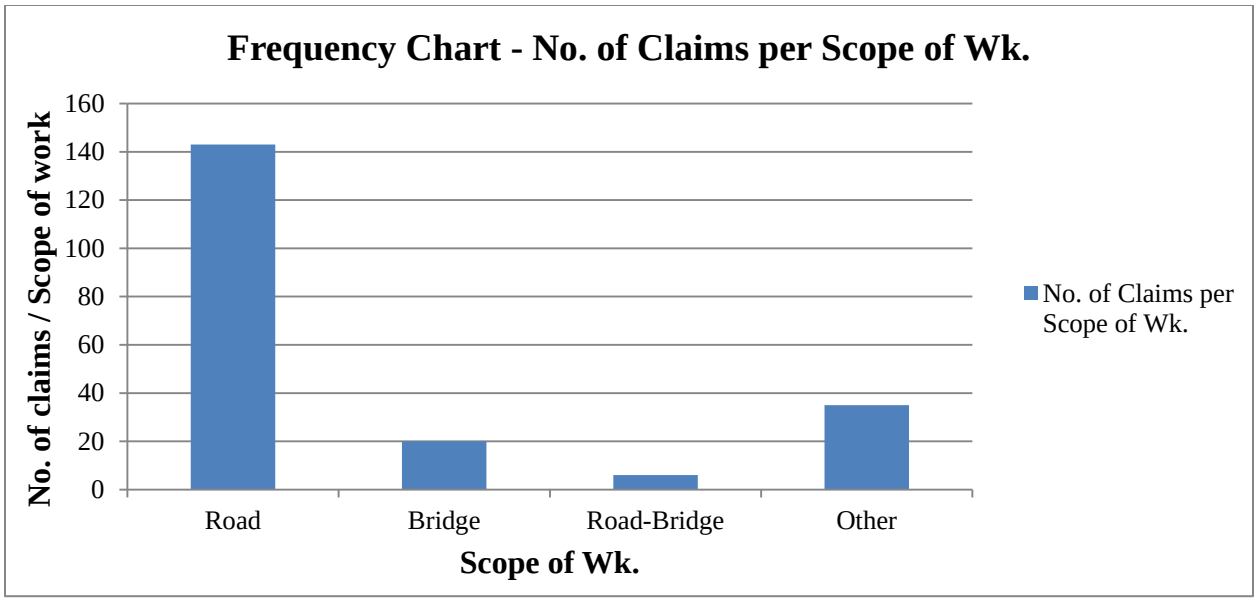


Figure 27

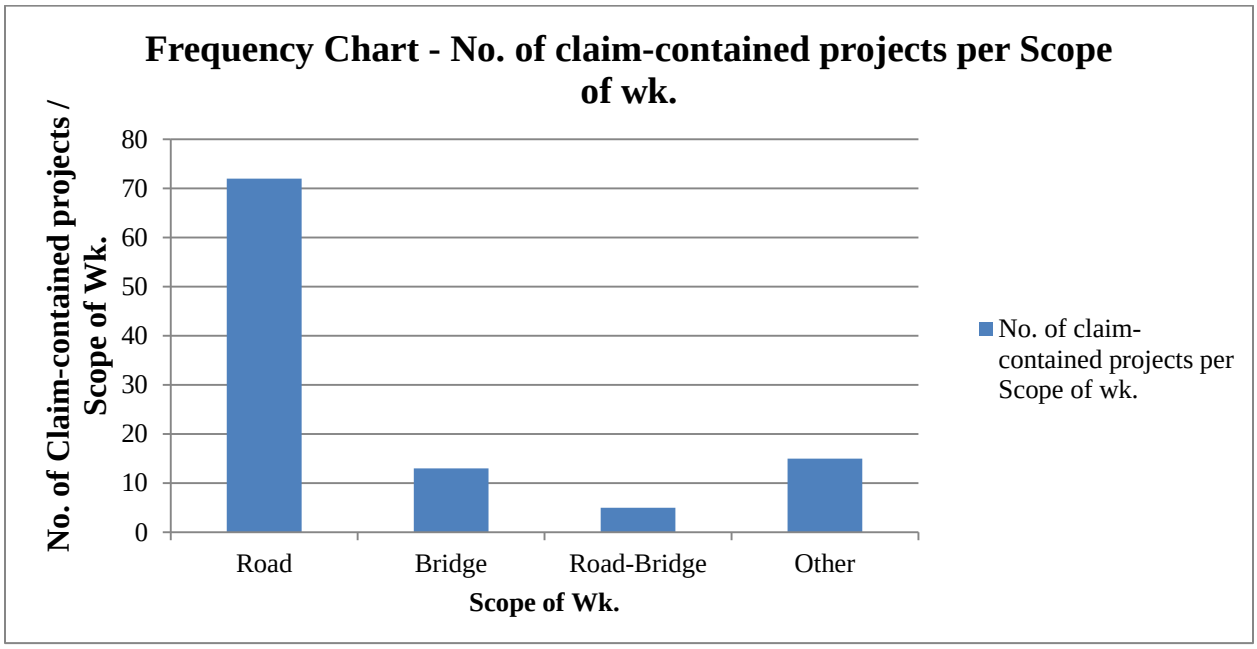


Figure 28

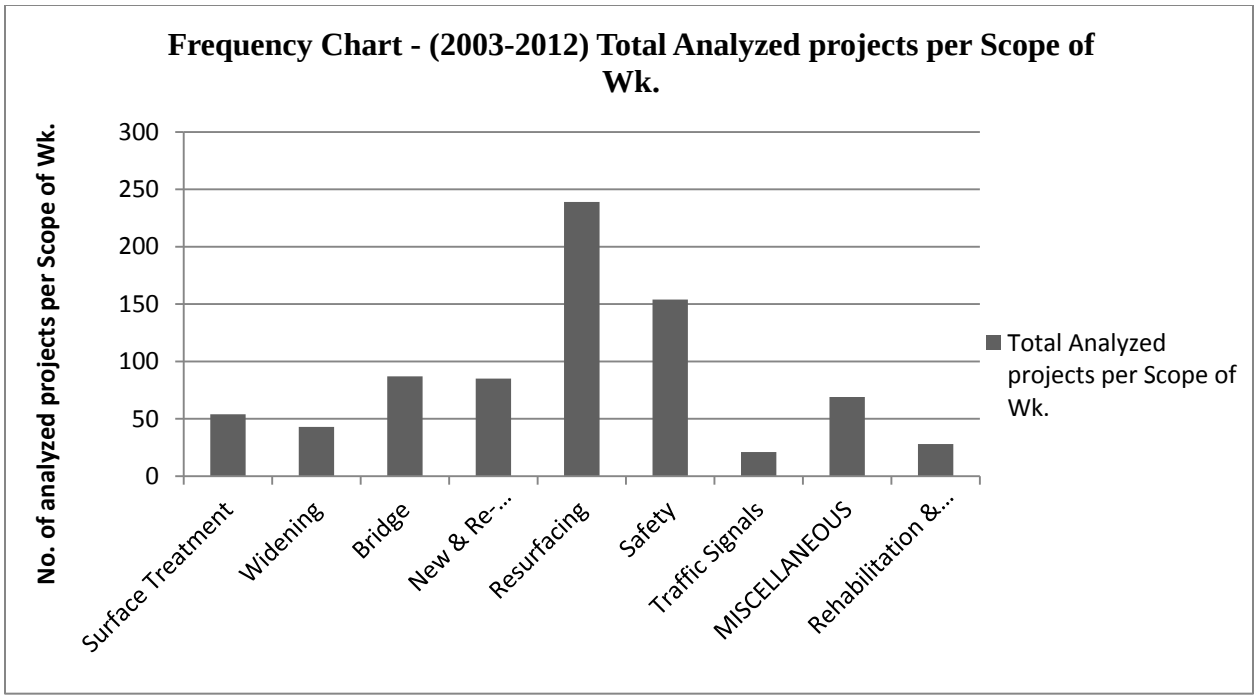


Figure 29

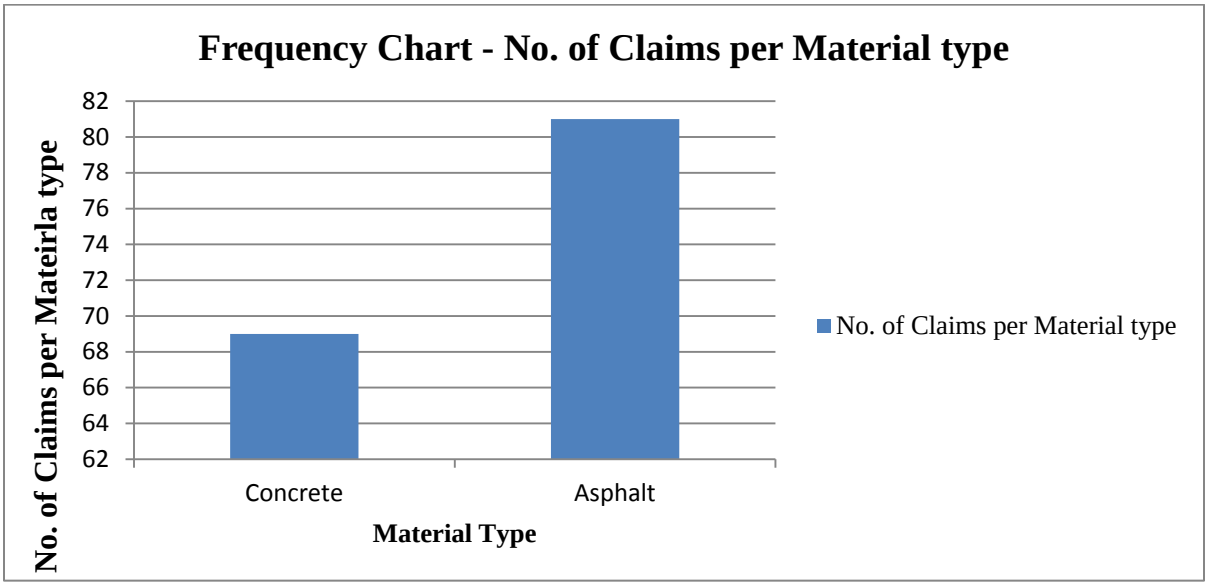


Figure 30

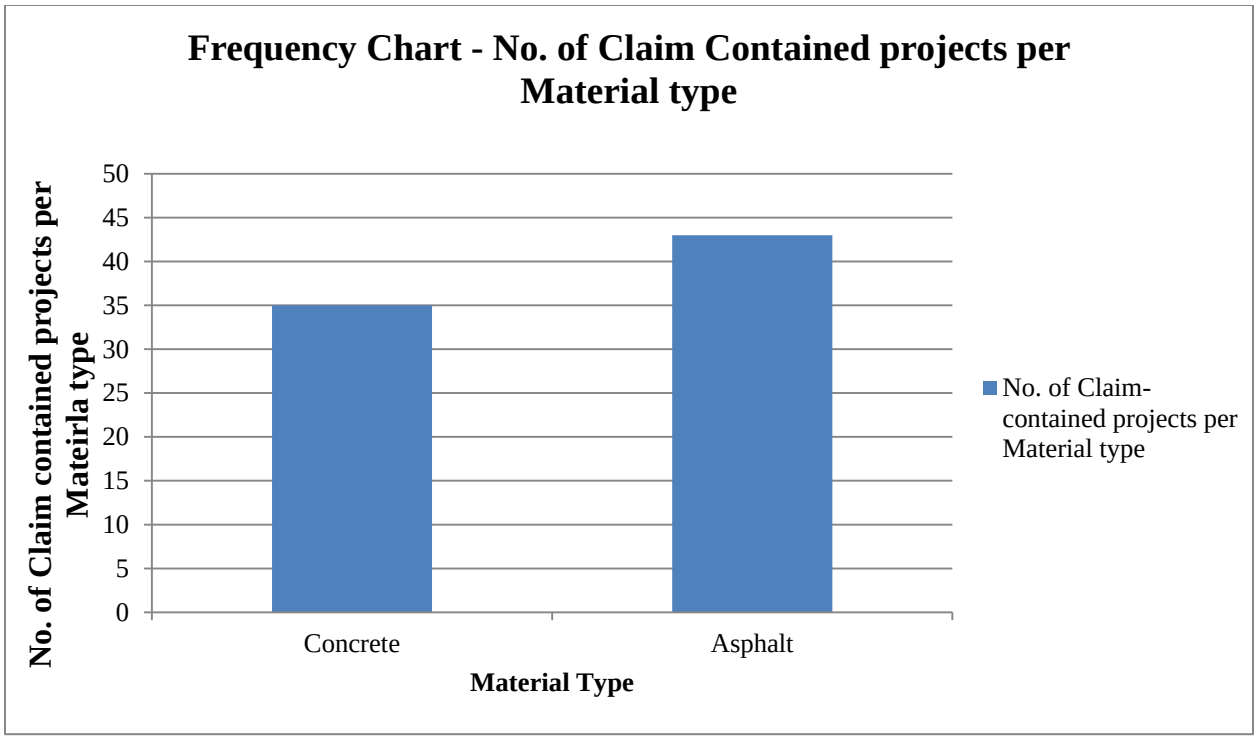


Figure 31

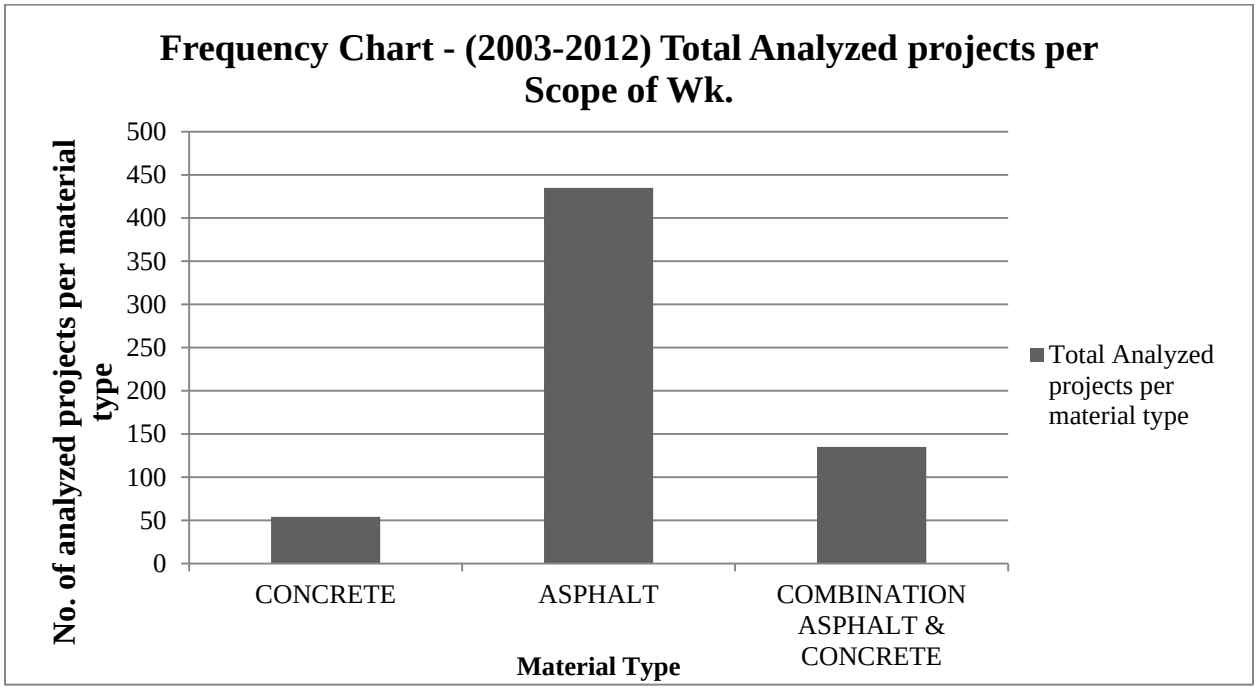


Figure 32

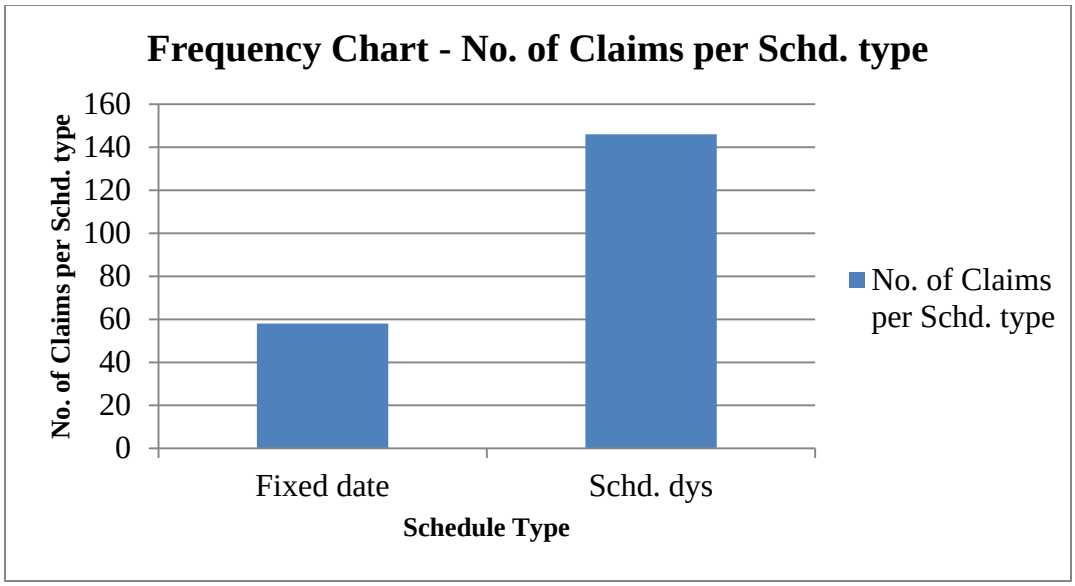


Figure 33

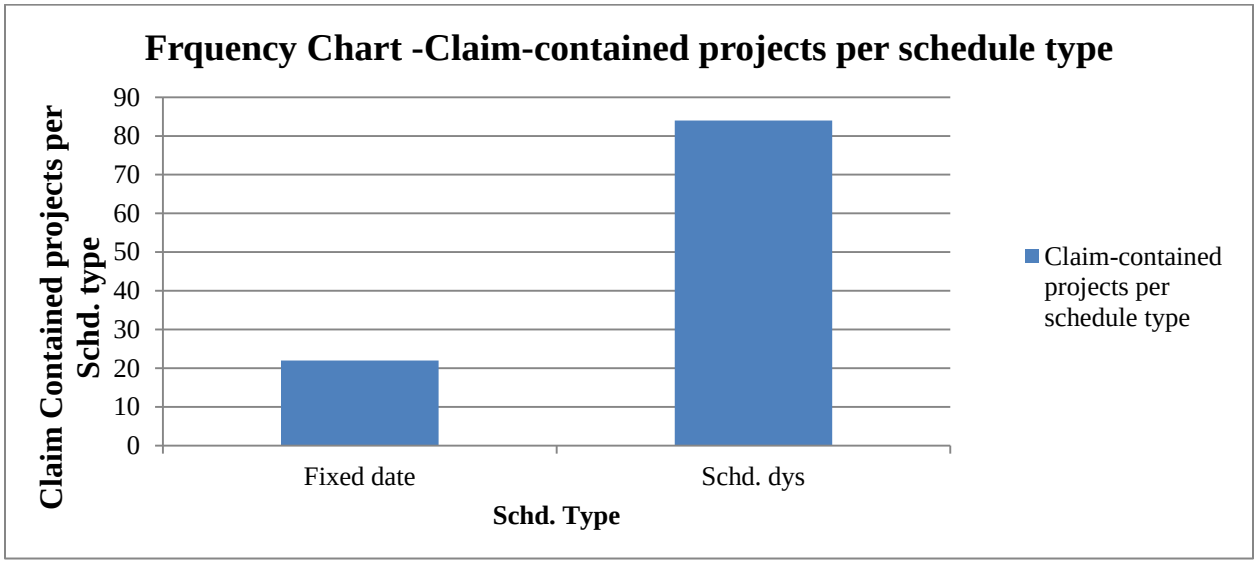


Figure 34

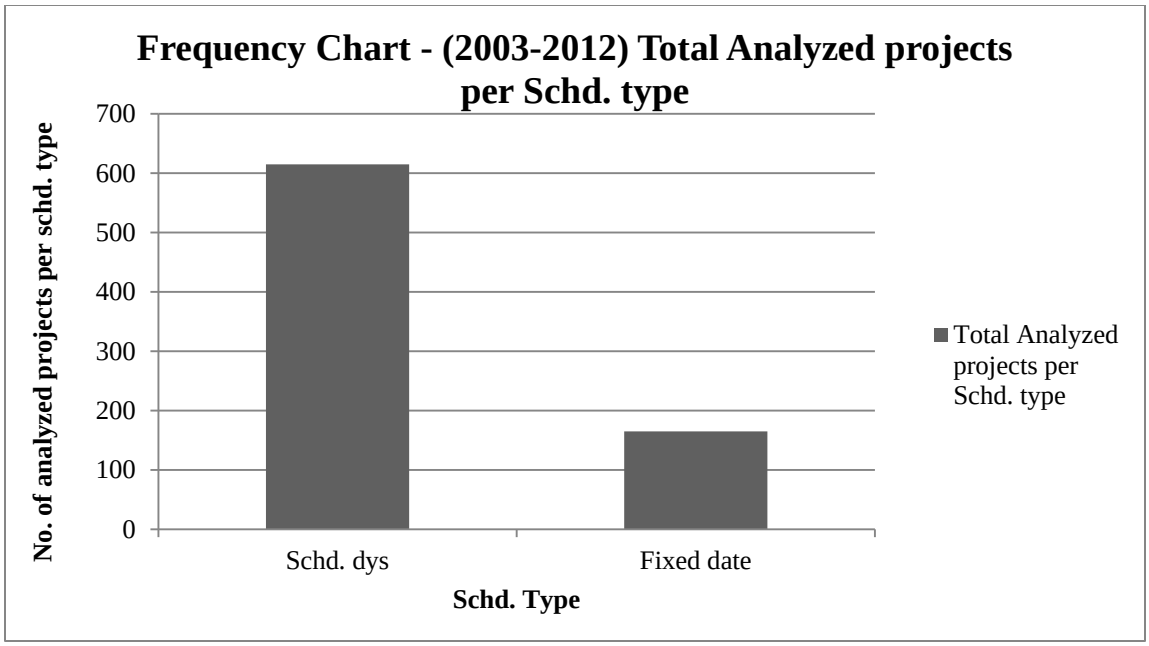


Figure 35

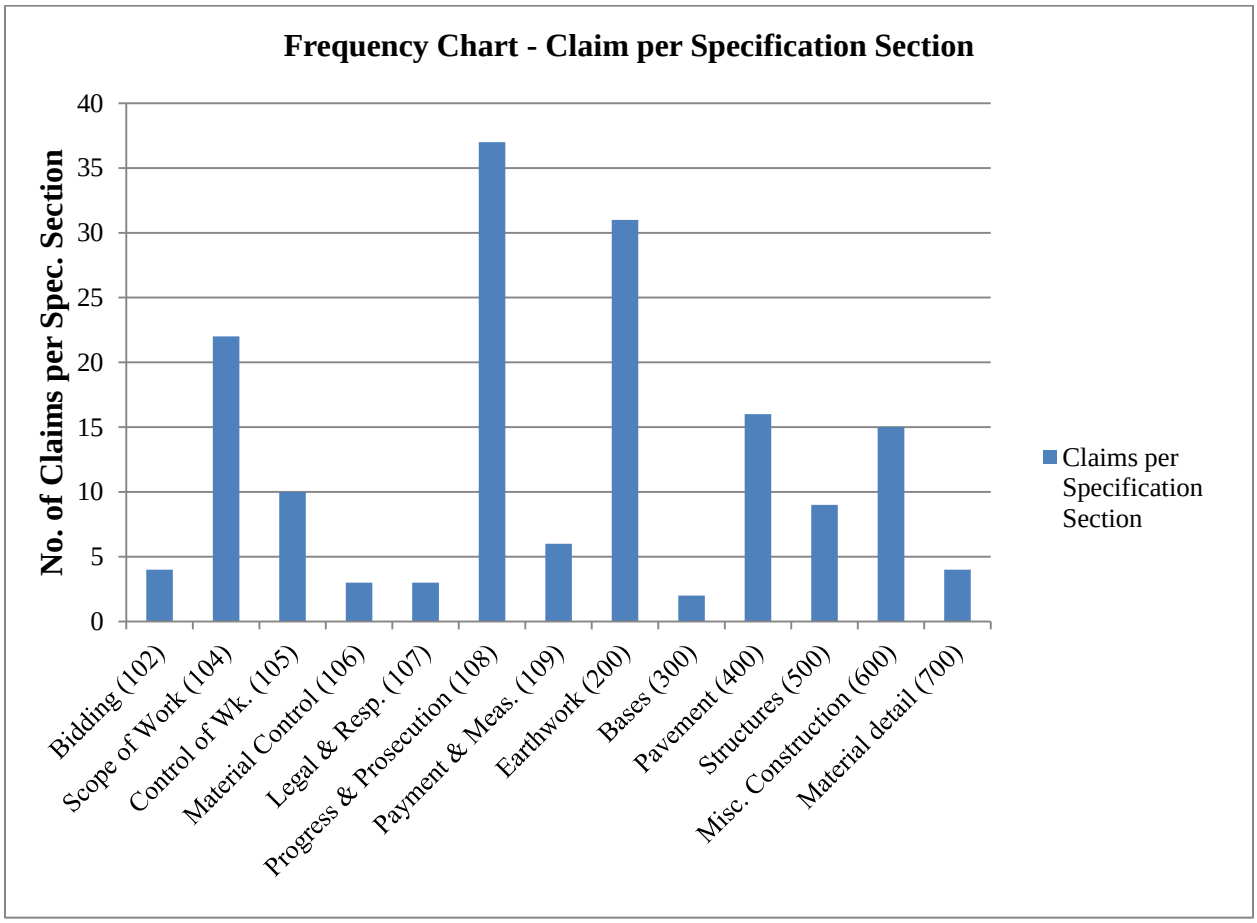


Figure 36

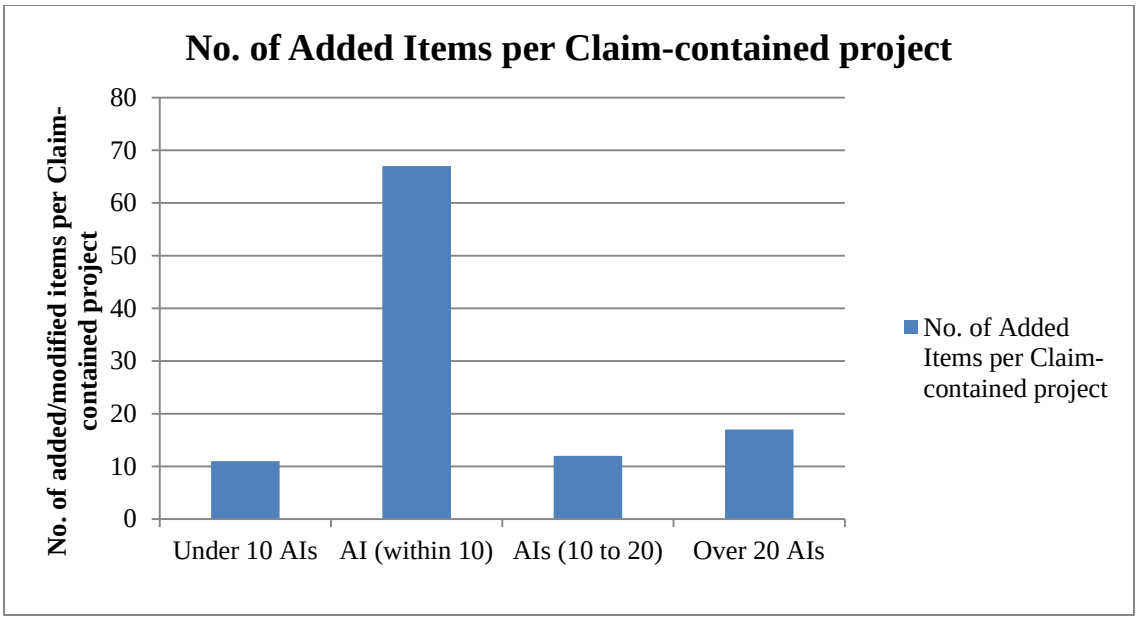

No. of Added Items per Claim-contained project
No. of added/modified items per Claim-contained project
80
70
60
50
40
30
20
10
0
Under 10 AIs
AI (within 10)
AIs (10 to 20)
Over 20 AIs
No. of Added Items per Claim-contained project

Figure 37

Appendix E – SPSS Analysis Tables

Correlations[c]

			Claims	Region	Budget Variation	Schedule Variation	Schedule Type	Scope Type	Road Type
Spearman's rho	Claims	Correlation Coefficient	1.000	.008	.047	.131**	-.041	.052	.048
		Sig. (2-tailed)	.	.842	.243	.001	.310	.196	.231
	Region	Correlation Coefficient	.008	1.000	-.180**	-.126**	-.096*	-.095*	.113**
		Sig. (2-tailed)	.842	.	.000	.002	.017	.017	.005
	Budget Variation	Correlation Coefficient	.047	-.180**	1.000	.292**	.006	.100*	.043
		Sig. (2-tailed)	.243	.000	.	.000	.872	.013	.285
	Schedule Variation	Correlation Coefficient	.131**	-.126**	.292**	1.000	.199**	.029	.014
		Sig. (2-tailed)	.001	.002	.000	.	.000	.467	.736
	Schedule Type	Correlation Coefficient	-.041	-.096*	.006	.199**	1.000	.122**	.007
		Sig. (2-tailed)	.310	.017	.872	.000	.	.002	.852
	Scope Type	Correlation Coefficient	.052	-.095*	.100*	.029	.122**	1.000	.240**
		Sig. (2-tailed)	.196	.017	.013	.467	.002	.	.000
	Road Type	Correlation Coefficient	.048	.113**	.043	.014	.007	.240**	1.000
		Sig. (2-tailed)	.231	.005	.285	.736	.852	.000	.

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

c. Listwise N = 624

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	624	80.0
	Missing Cases	156	20.0
	Total	780	100.0
Unselected Cases		0	.0
Total		780	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
No Claim	0
Claim	1

Classification Table[a,b]

	Observed		Predicted		
			Claims		Percentage Correct
			No Claim	Claim	
Step 0	Claims	No Claim	577	0	100.0
		Claim	47	0	.0
	Overall Percentage				92.5

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-2.508	.152	273.299	1	.000	.081

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Region	.043	1	.837
		BudgetVar	1.326	1	.249
		SchdVar	10.158	1	.001
		SchdType	1.035	1	.309
		Scope	1.346	1	.246
		RdType	.712	1	.399
	Overall Statistics		15.288	6	.018

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	14.797	6	.022
	Block	14.797	6	.022
	Model	14.797	6	.022

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	318.654[a]	.023	.057

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	8.085	8	.425

Contingency Table for Hosmer and Lemeshow Test

		Claims = No Claim		Claims = Claim		Total
		Observed	Expected	Observed	Expected	
Step 1	1	62	61.184	1	1.816	63
	2	60	61.420	4	2.580	64
	3	61	59.274	1	2.726	62
	4	59	58.912	3	3.088	62
	5	60	59.455	3	3.545	63
	6	59	57.930	3	4.070	62
	7	57	57.105	5	4.895	62
	8	51	56.090	11	5.910	62
	9	56	54.211	6	7.789	62
	10	52	51.418	10	10.582	62

Classification Table[a]

			Predicted		
			Claims		Percentage Correct
			No Claim	Claim	
Step 1	Claims	No Claim	577	0	100.0
		Claim	47	0	.0
	Overall Percentage				92.5

a. The cut value is .500

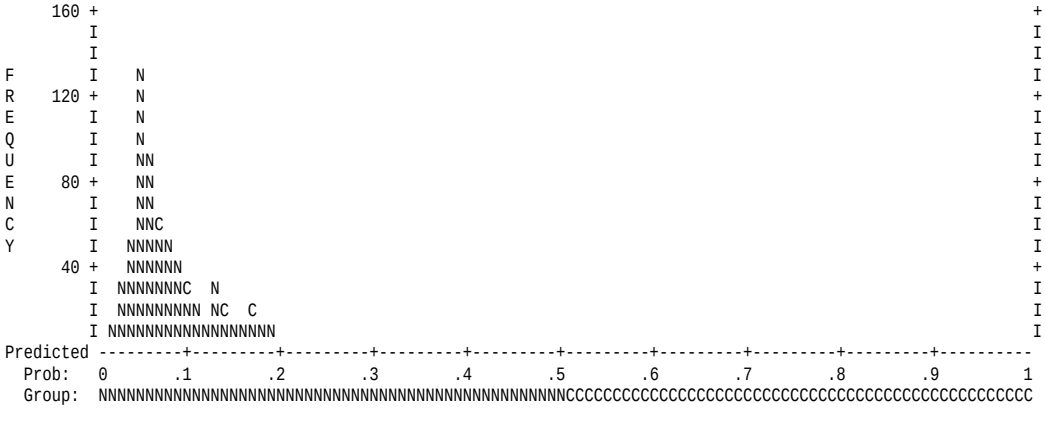
Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Region	.044	.088	.245	1	.621	1.045
	BudgetVar	.017	.136	.016	1	.900	1.017
	SchdVar	.425	.131	10.547	1	.001	1.530
	SchdType	-.728	.437	2.773	1	.096	.483
	Scope	.075	.064	1.377	1	.241	1.078
	RdType	.100	.184	.296	1	.586	1.105
	Constant	-3.228	.788	16.776	1	.000	.040

a. Variable(s) entered on step 1: Region, BudgetVar, SchdVar, SchdType, Scope, RdType.

Step number: 1

Observed Groups and Predicted Probabilities


160
120
80
40
F
R
E
Q
U
E
N
C
Y
Predicted
Prob: 0 .1 .2 .3 .4 .5 .6 .7 .8 .9 1
Group: NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNCCC

APPENDIX F – CASE STUDY FIGURES

This Case Study will showcase not only the results of different schedule analysis methods for delays but will also shows the effect of the different resulting delays on the costs associated with those delays using different costing techniques that covers all associated cost types represented in labor, material, equipment and overheads. The main goal from this case study is to direct the research towards the best practices of handling the schedule delay analysis by pointing out the different results, their fairness and their effect on the associated costs. All the primavera schedule versions on the schedule analysis results are as shown in the following figures:

Schedule Analysis Results

AP (As-planned) Vs. AB (As-Built) schedule

Using the As-planned vs. As-built method that was explained earlier, the result were represented into 2 different schedules, an AP schedule which represent 176 days of work as in figure 1 versus an AB schedule which is resulting in finishing the same scope of work in an extended duration of 191 days after the delays occurrence as shown in figure 39.

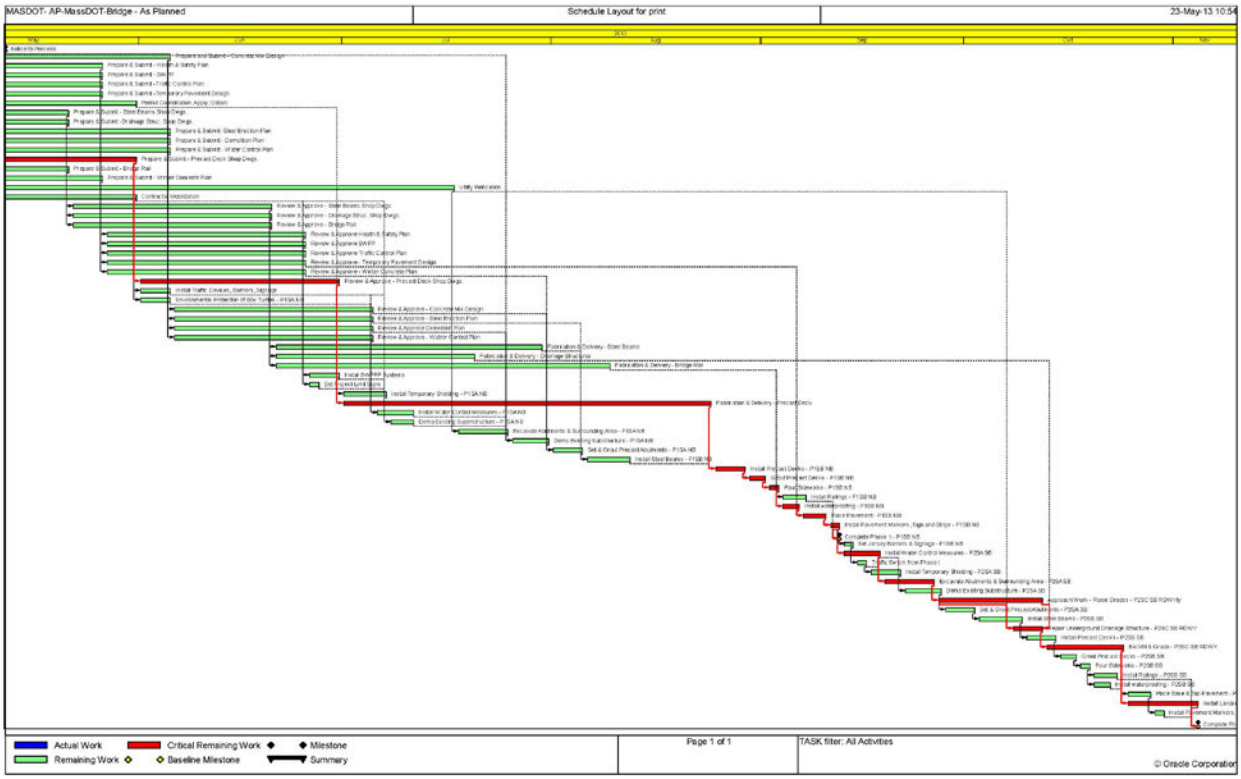


Figure 38. Project As-Planned (AP) Schedule

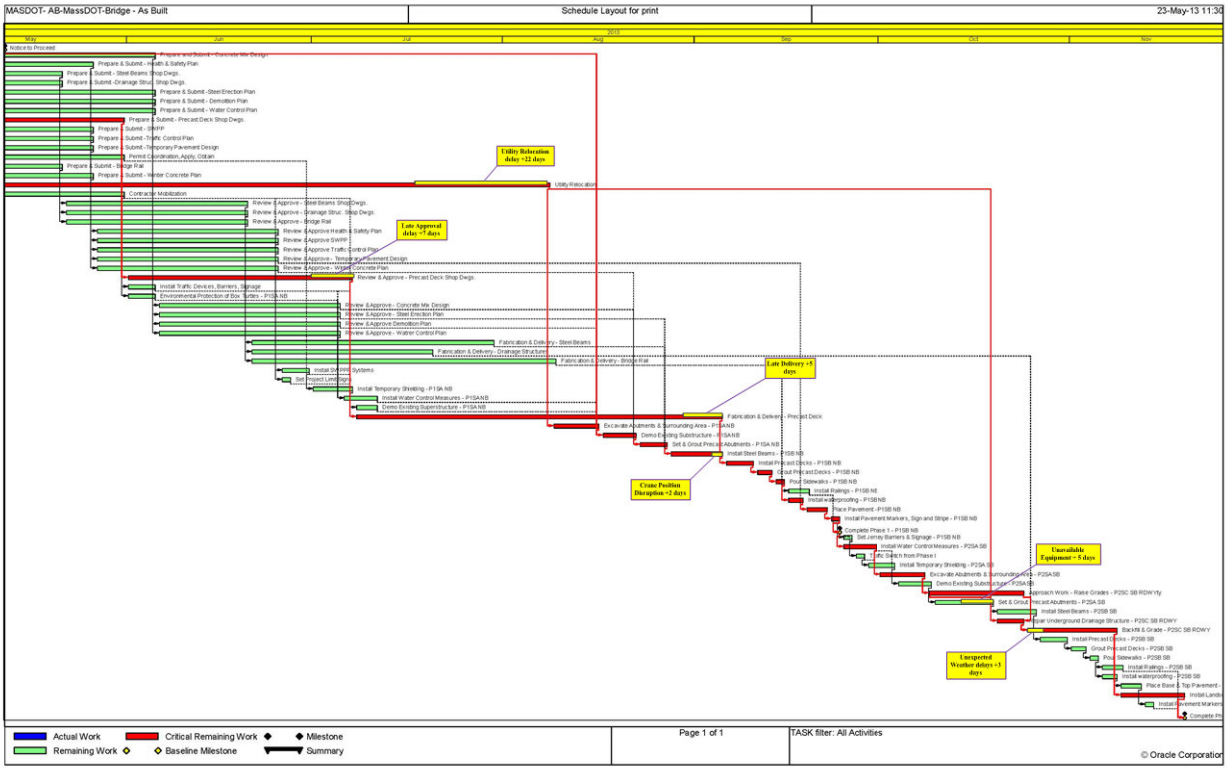


Figure 39. Project As-Built (AB) Schedule

From the results of the 2 schedules, the total delay duration entitled is calculated as in the following: Total Entitled delay duration = AB schedule duration – AP schedule duration = 191 days- 176 days; Therefore, the total delay duration entitled is ***15 days***.

Impacted As-planned (IAP) schedule analysis – What-If or "Adjusted AP"

The results for the IAP method is depending on two types of schedules, the first is the AB schedule which includes all the delays as shown in figure 39. The second type of schedule is an AP-schedule which includes only the contractor's delays as in figure 40.

From the results of the 2 schedules, the total delay duration entitled is calculated as in the following: Total Entitled delay duration = AB schedule duration – IAP schedule duration

(including only contractor's delays) = 191 days- 181 days; Therefore, the total delay duration entitled is ***10 days***.

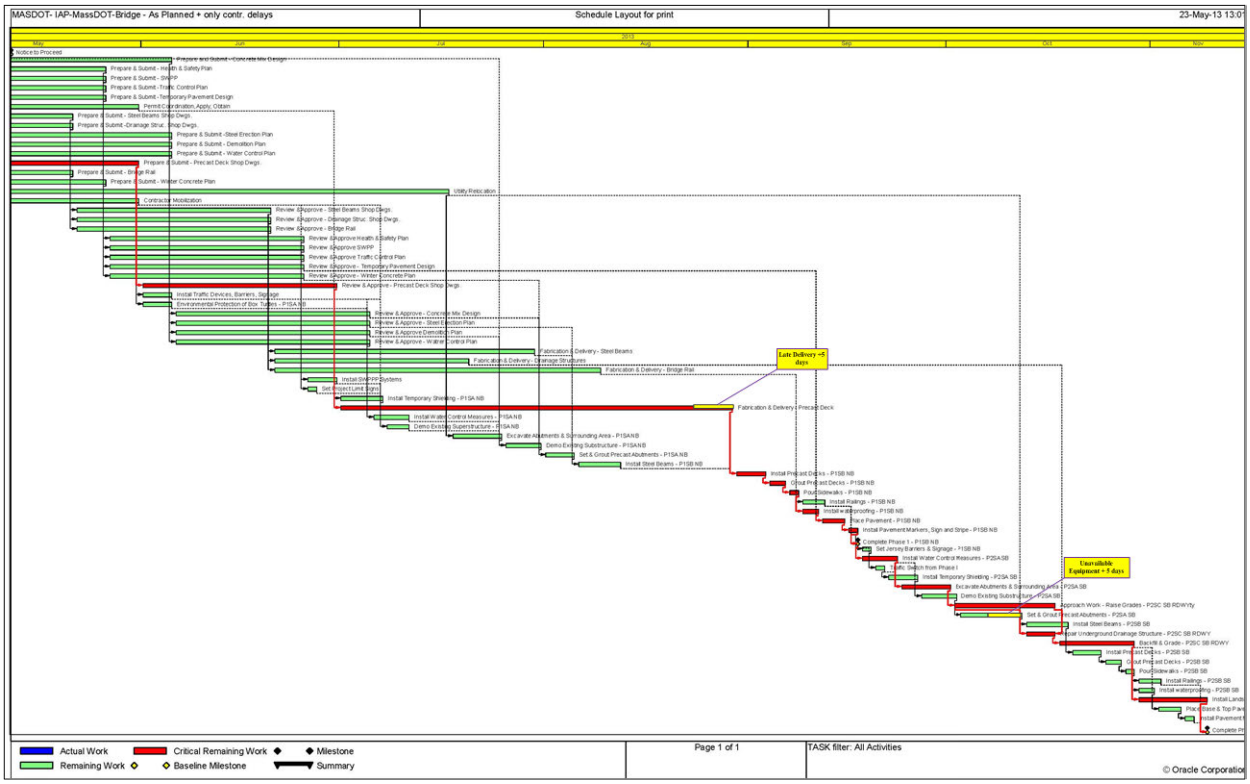


Figure 40. AP-schedule which includes only the contractor's delays

Collapsed As-Built (CAB) schedule analysis – But For or "Adjusted Baseline"

The result of this analytical method is evaluated through different schedules as in the following:

1- As-Built Schedule, AP (similar to figure 39)

2- As-Planned Schedule , AB (similar to figure 38)

3- CAB – But for Owner delays Schedule, *this is a schedule where all owner delays are excluded* (figure 41).

4- CAB – But for Owner & Excusable Delays Schedule, *this is a schedule where all owner and excusable delays are excluded* (figure 42).

After all the above schedules are created, the delay duration entitled is calculated according to the following simple equations:

AB = AP + Contractor Delays + Owner Delays + Time extension; *Solve for Contractor's delay*

; Owner Delays = AB – But for Owner's delays

; Time Extension = But for Owner's delays – But for Owner & Excusable delays

Total delay duration Entitled = AB – AP- Contractor's delay

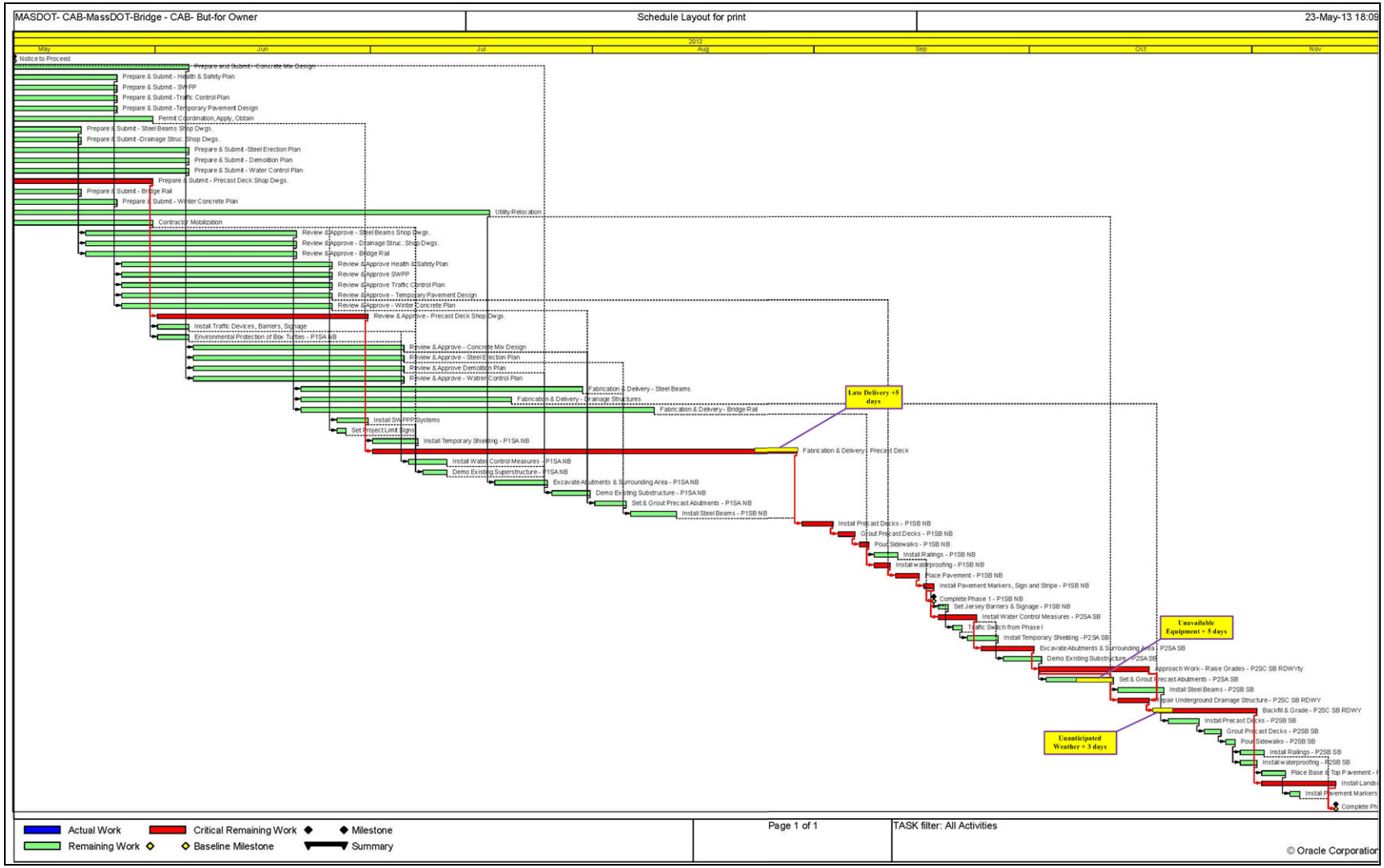


Figure 41. CAB – But for Owner delays Schedule, this is a schedule where all owner delays are excluded

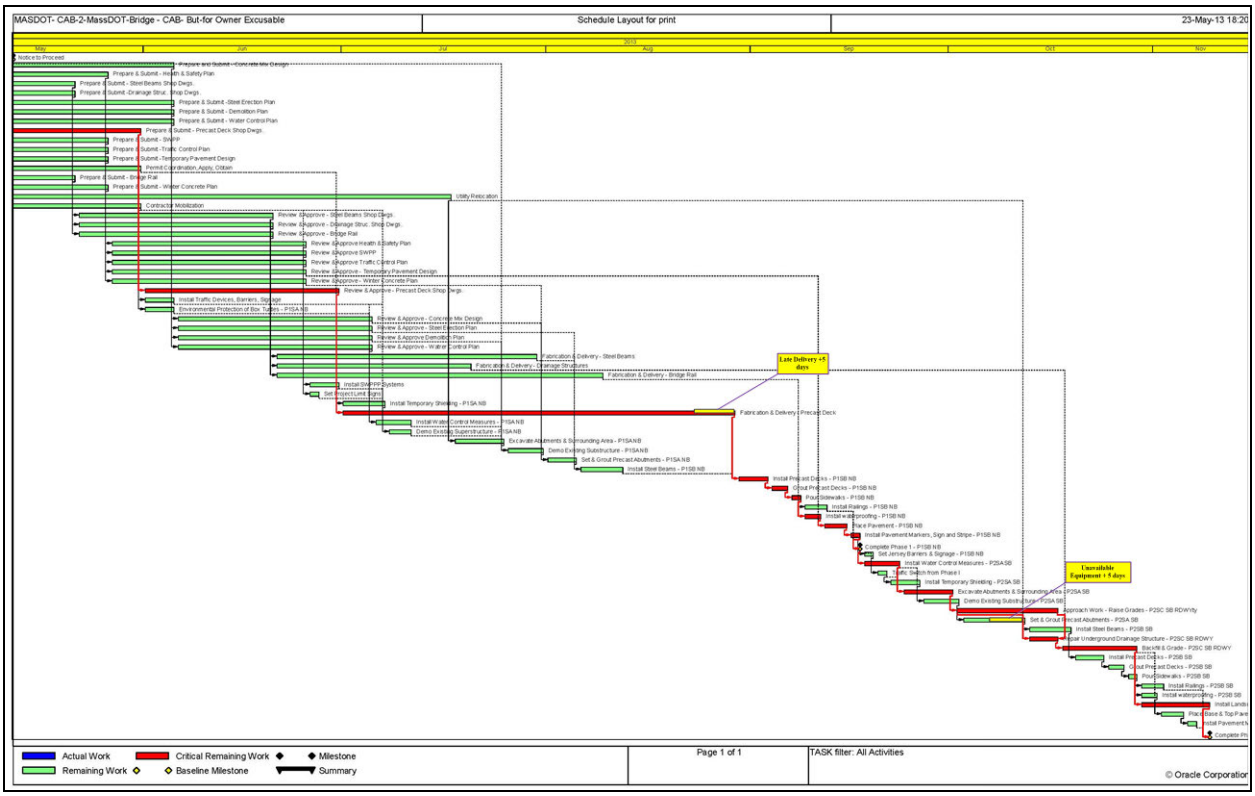


Figure 42. CAB – But for Owner & Excusable Delays Schedule, this is a schedule where all owner and excusable delays are excluded

Window Analysis

As explained before, the window analysis is several snapshots taken to analyze specific time periods within the schedule. In this case, 3 windows were taken as shown in figure 43 and assessed accordingly, and then the delay effects from all windows were summed up to come up with the total delay duration entitled. All the windows are based on each other to model the cumulative, contemporaneous effect of the schedule sequence.

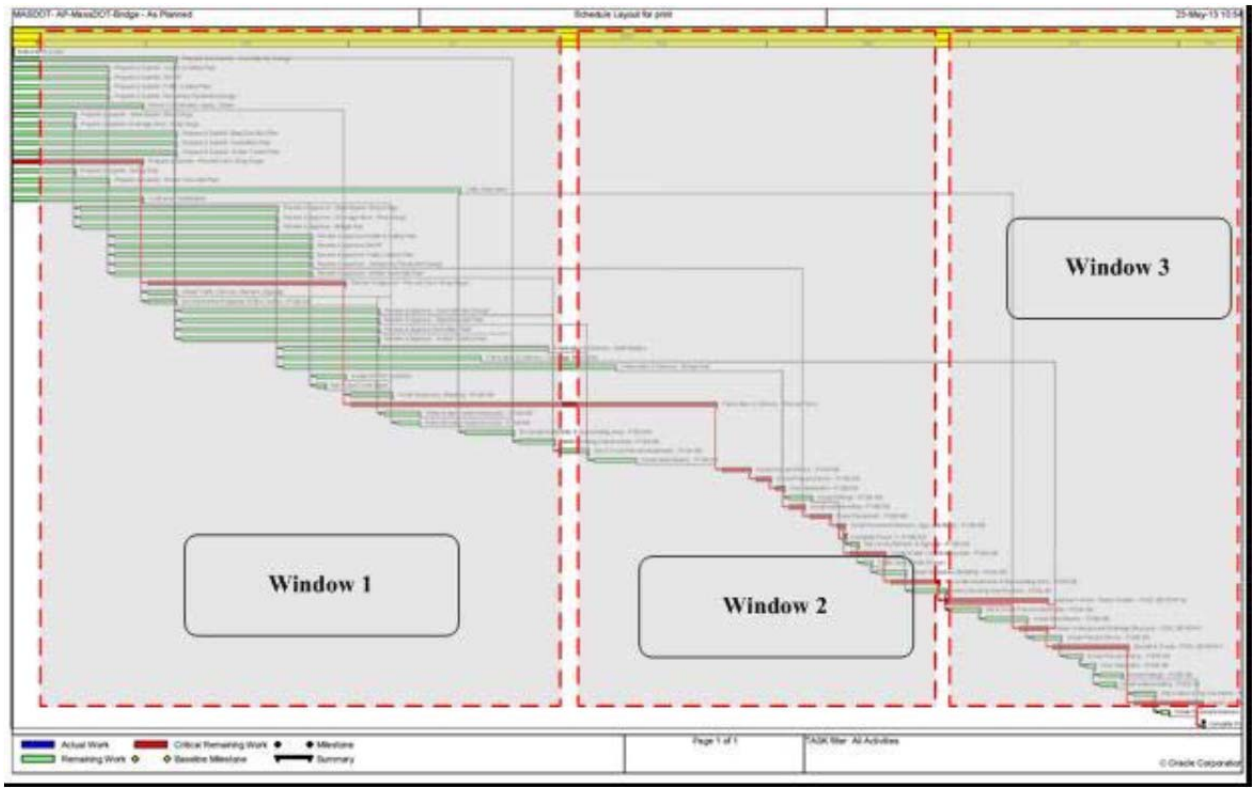


Figure 43. Windows displayed on the AP Schedule

Window 1

Window 1 will include the activities from the beginning of the project at the Notice to proceed (NTP) milestone up to the beginning of actual bridge-related work on site by the contractor, as in the excavation of the abutments. This window is including 2 owner related delays represented in

the utility relocation delays and the late approval of the precast deck shop drawings. This window was analyzed as in (figure 44).

Based on the Analysis of Window 1, the total project duration is delayed by 10 days which are all resulted from the 2 owner-caused delays represented in the utility relocation delays and the late approval of precast deck shop drawings. The critical path also changed, the most important issues with the critical path changes as seen in (figure 44) is that now the utility relocation became the major driver on the critical path, the shop drawings of precast deck along with its fabrication and delivery are no longer critical, also the excavation of the abutments and surrounding areas became critical along with a s long chain of subsequent activities. Finally, the results can conclude that this window results in ***10 days of compensable delays*** since it is all owner-caused delays.

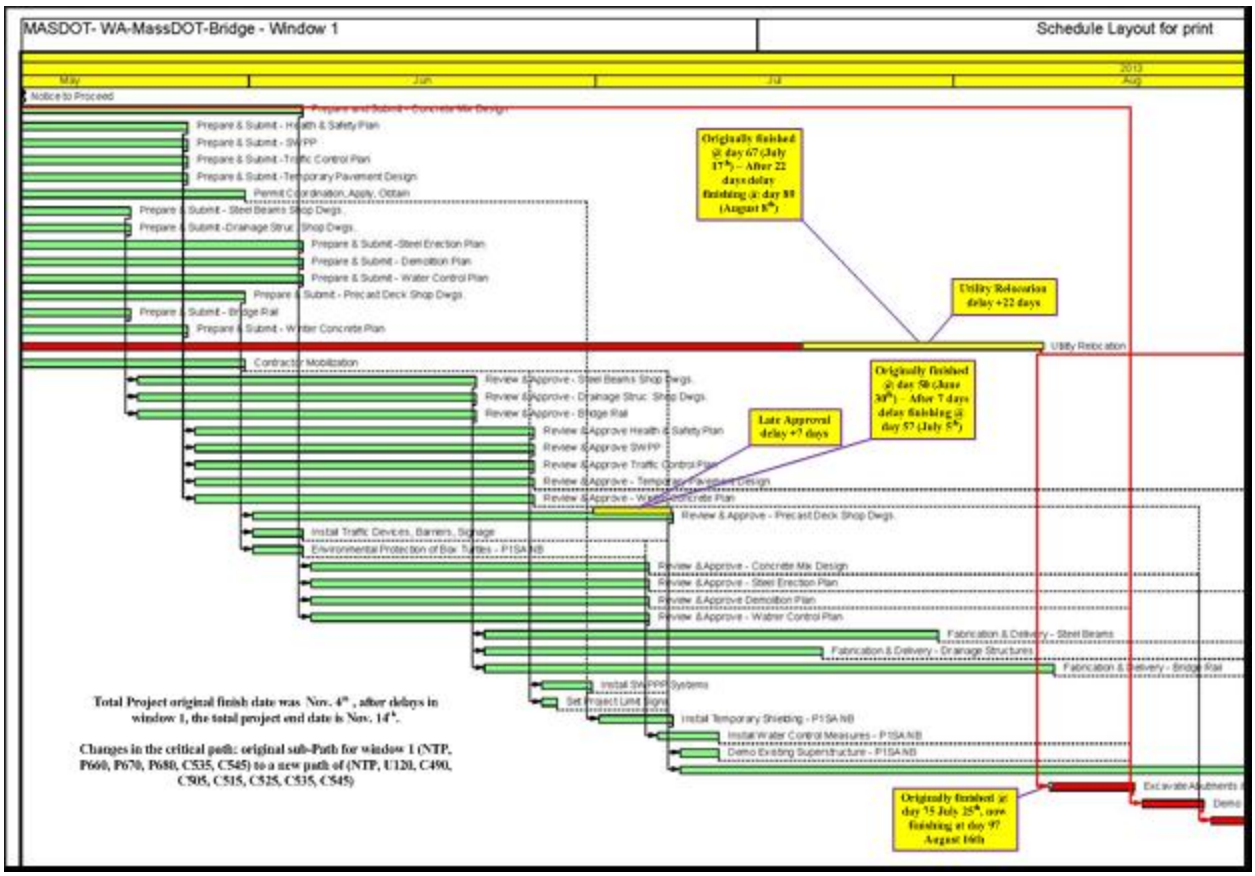


Figure 44. Window 1

Window 2

Window 2 will include the activities from the beginning of the window 1's end (Excavate abutments) up to the abutment excavation of the project's phase two. This window is including 2 concurrent delays, the first is a contractor- related delay represented in the late delivery of the fabricated precast bridge decks and the second concurrent delay is an owner-related delay represented in the work disruption for the crane work during installing the steel beams due to positioning issues. This window was analyzed as in (figure 45).

Based on the Analysis of Window 2, the total project duration is delayed by 2 days. However, the contractor delays have only 2 days that consumed the critical path and it happens to be in concurrency of the owner-caused delay that happened in the same time. The critical path slightly

changed, by putting the precast delivery of the fabricated precast deck on the critical path as shown in (figure 45). Finally, the results can conclude that this window results in ***2 days of Excusable, non-compensable delays*** since it is a result from 2 party concurrent delays.

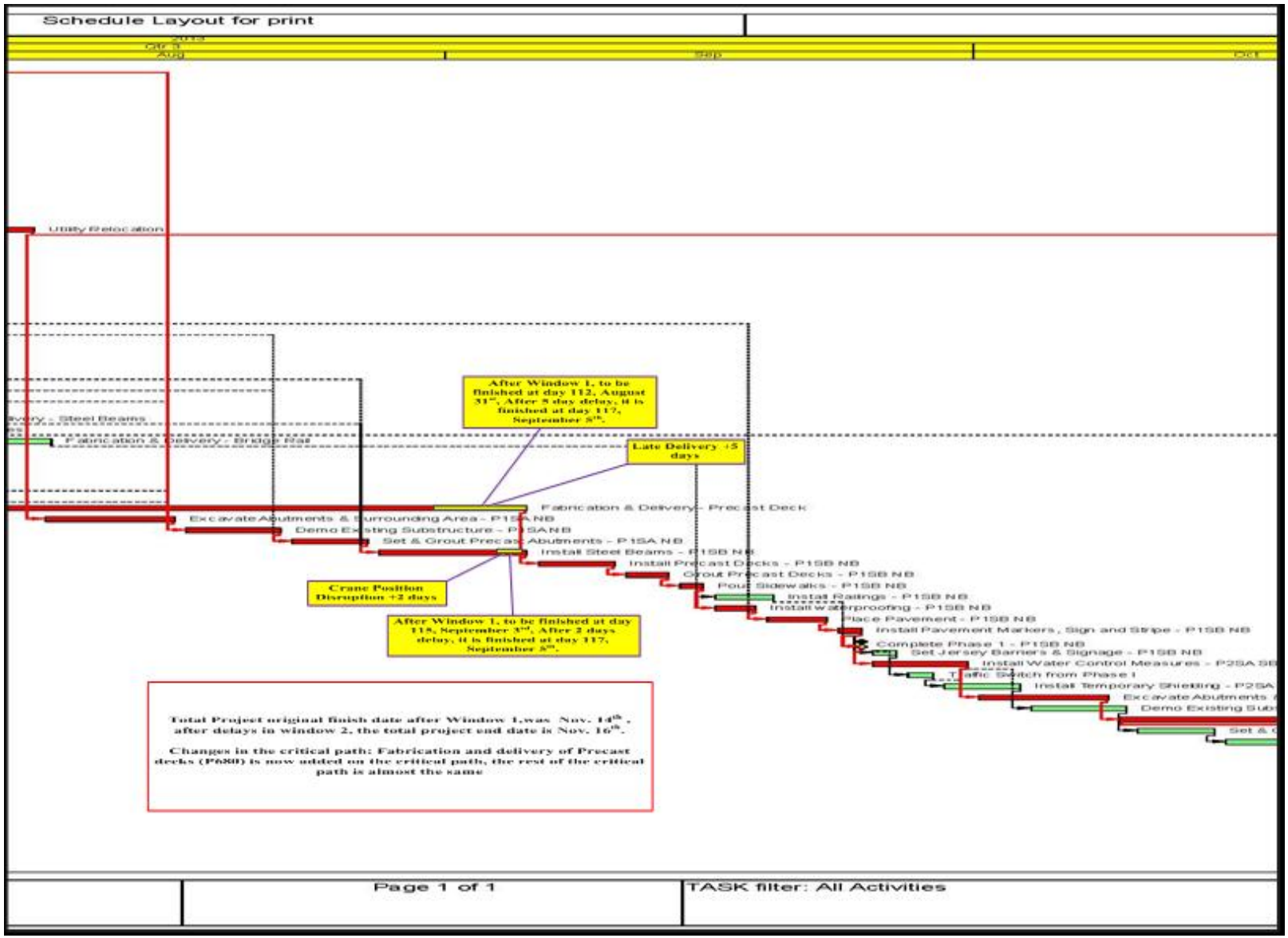


Figure 45. Window 2

Window 3

Window 3 will include the activities from the beginning of the window 2's end (Excavate abutments of phase 2) up to the end of the project construction completion. This window is including 2 different types of delays. The first delay is a contractor delay resulting from un-available equipment during the abutment setting and the second delay is an unanticipated weather delay. This window was analyzed as in (figure 46).

Based on the Analysis of Window 3, the total project duration is delayed by 3 days. Since the contractors delays was not on the critical path, the delays resulted in this window is all attributed to the unanticipated weather delays. The critical path did not change as shown in (figure 46). Finally, the results can conclude that this window results in another ***3 days of Excusable delays*** since it is all results from unanticipated weather delays.

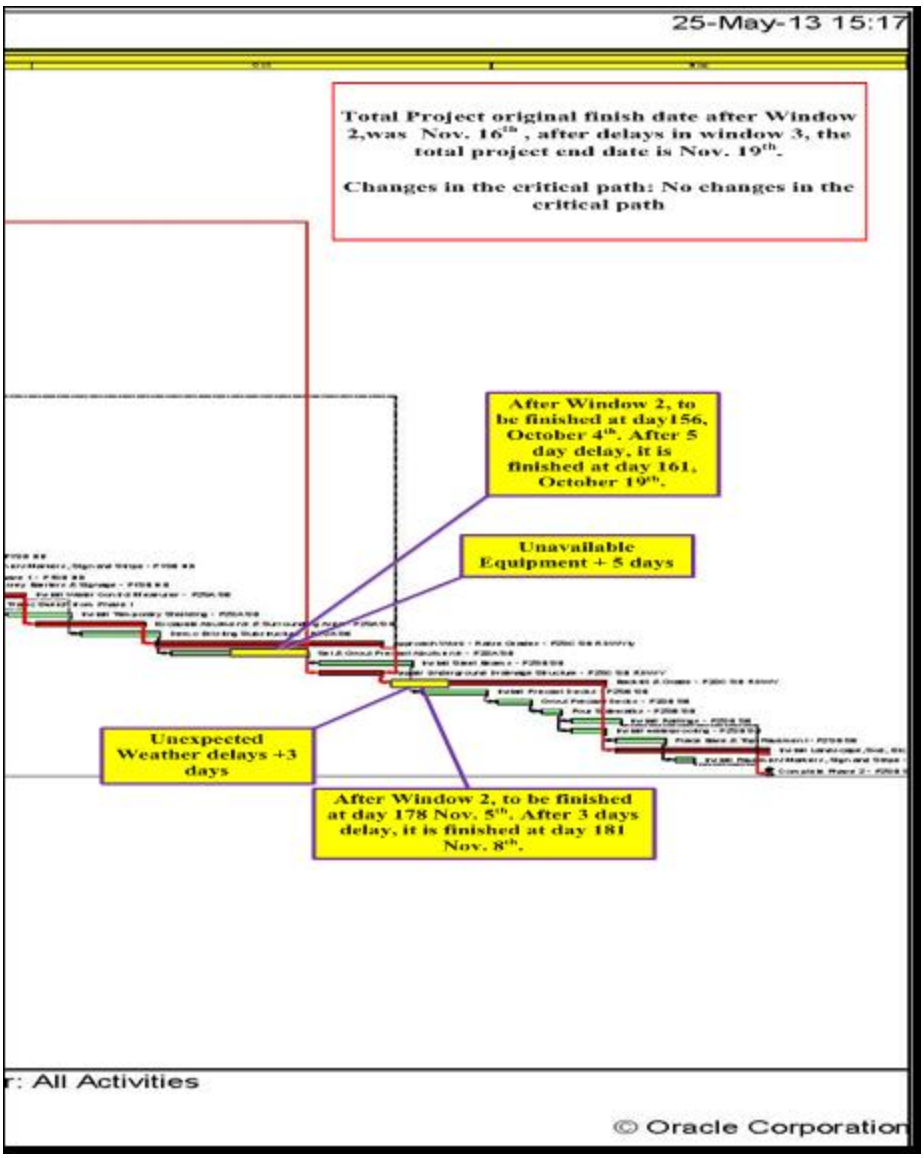


Figure 46. Window 3

Time Impact Analysis

Impact #1

The 1st impact in this case is the delay of approval of precast deck shop drawings as shown in (figure 47). After the analysis of this impact, it resulted in a total project delay of 5 days. Since, it is owner-caused delay that is on the critical path, it is an entitlement of 5 compensable days of delay. There was no major effect on the original main critical path.

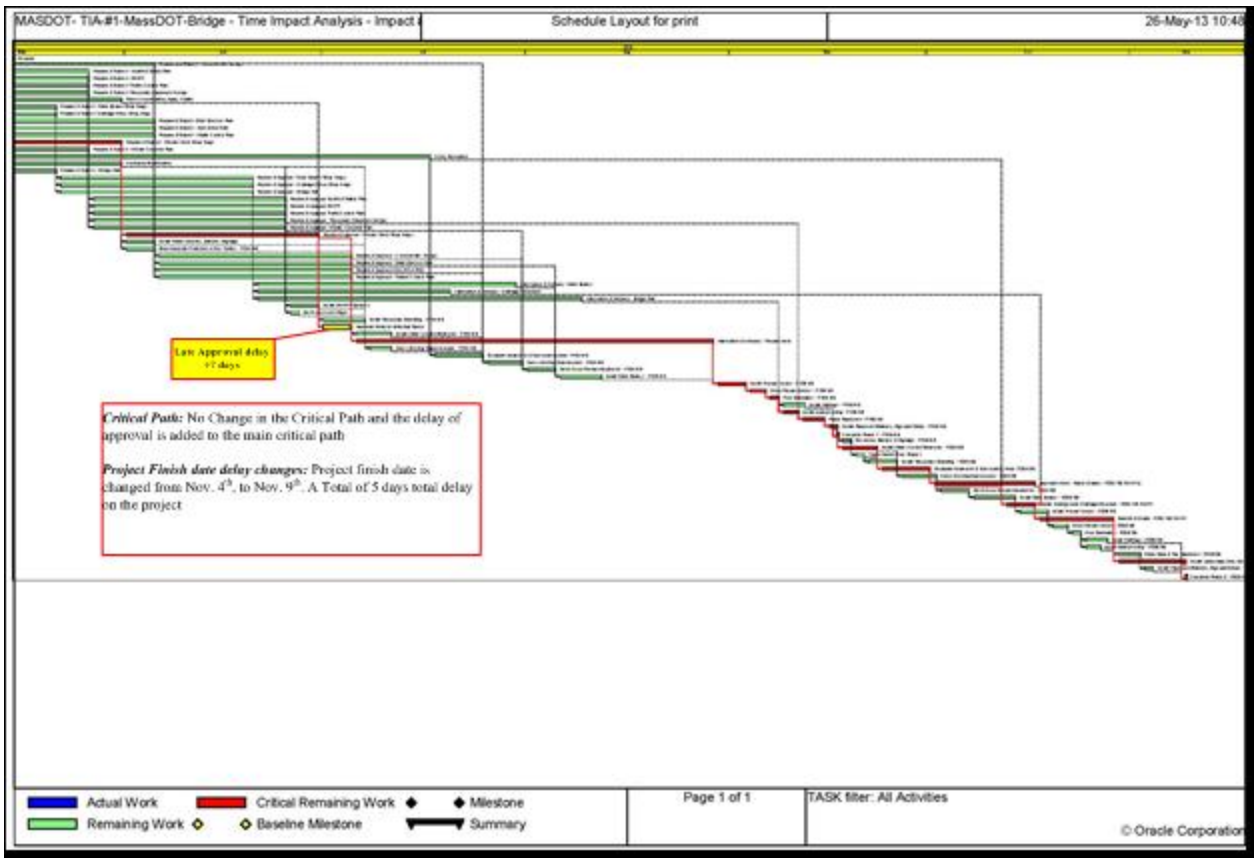


Figure 47. Impact #1

Impact #2

The 2nd impact is the utility relocation delay which is also another owner responsibility; the 2nd impact was analyzed as shown in (figure 48). According to the analysis results, the critical path now has major changes as in (figure 48). A total project delay of 5 more days was added which is resulted from another owner-caused delay. This translates into an entitlement of additional 5 compensable days of delay.

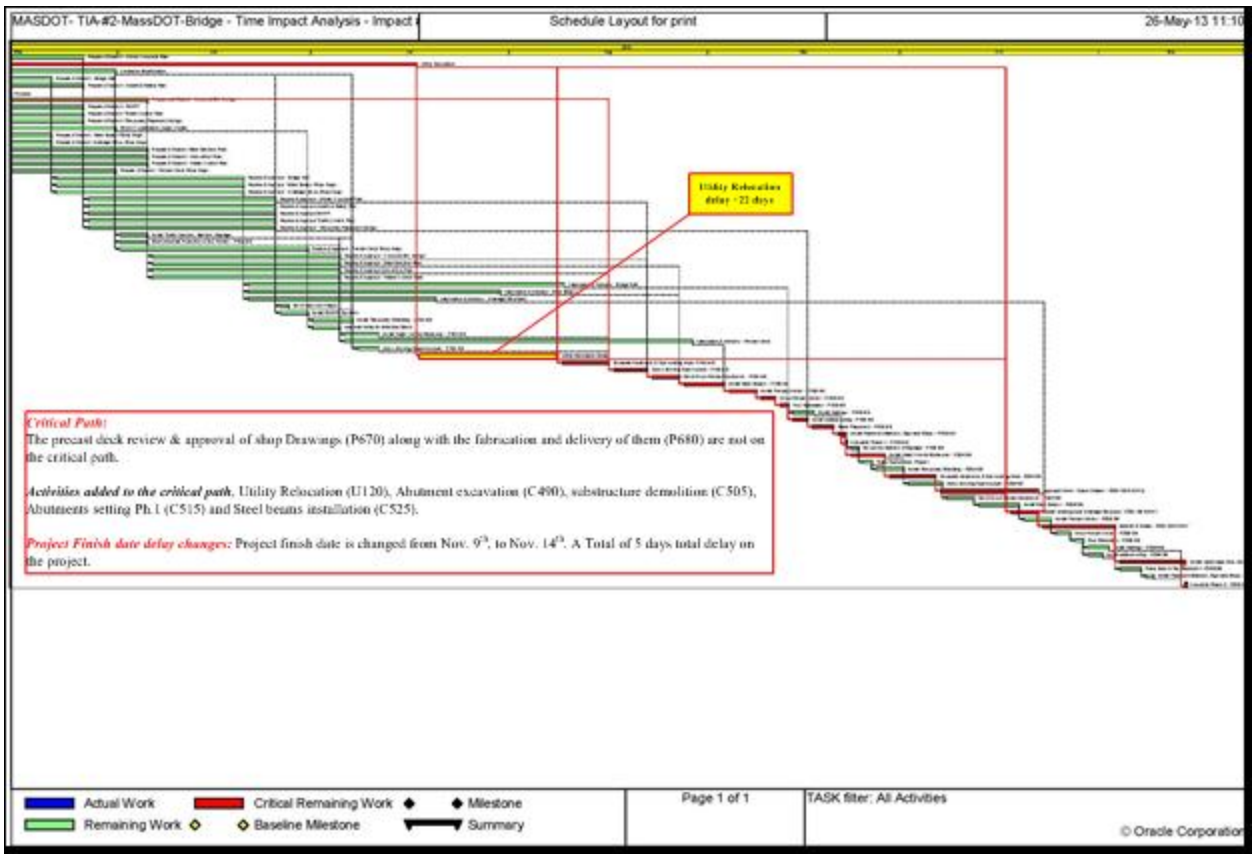


Figure 48. Impact #2

Impacts # 3&4

The 3rd and 4th impacts were analyzed together since they are considered concurrent delays. The 3rd impact represented in the late delivery of the precast decks is a contractor-related delay and the 4th impact of the crane positioning disruption is an owner-related delay as shown in (figure 49).

According to the analysis shown in (figure 49), there were no major changes in the critical path and the total project delay of 2 days was added to the total project duration. However, it is still compensable delay. The reason behind this analysis is that the contractor related delay remained a non-critical activity after its addition while the owner related delay was on the critical path

which is responsible of 2 additional days. This translates into an entitlement of additional 2 compensable days of delay.

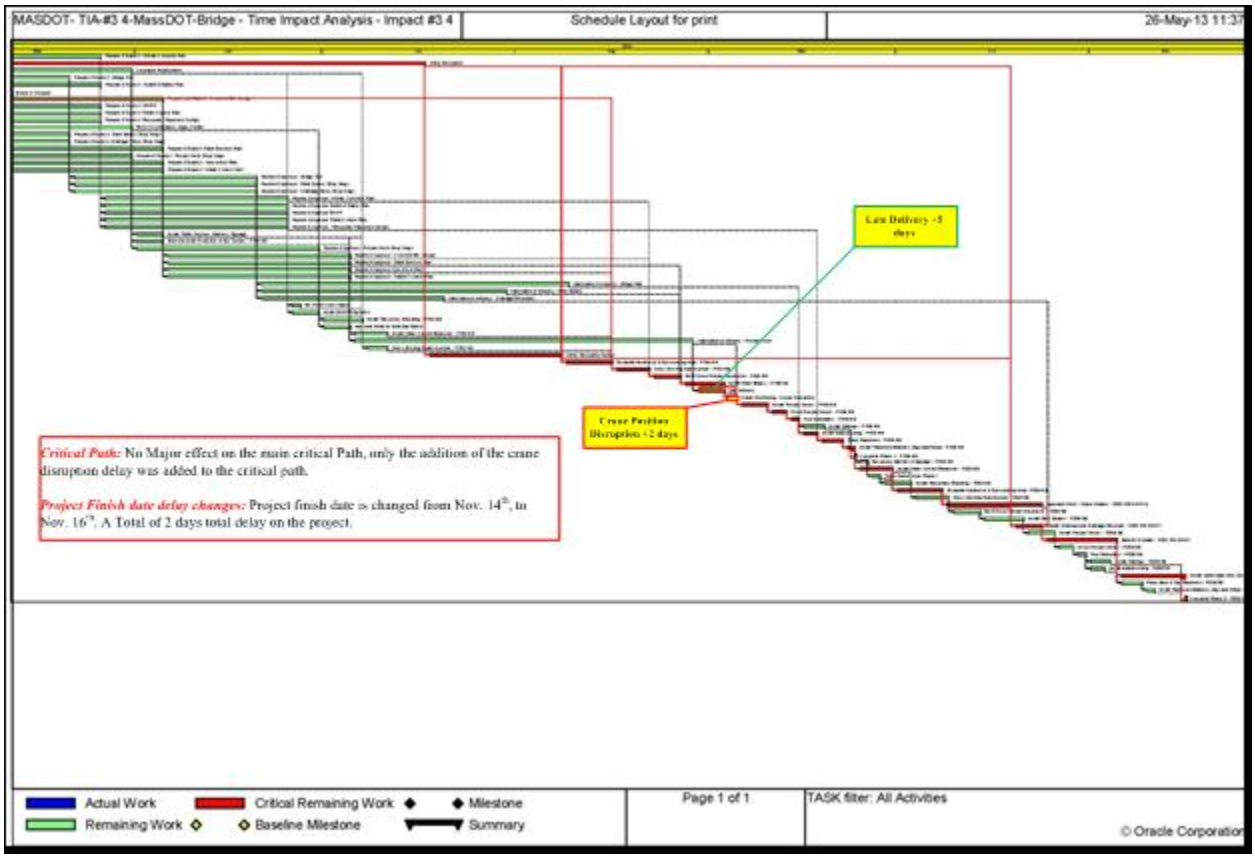


Figure 49. Impacts # 3&4

Impact #5

The 5th impact lies solely on the contractor where he had to replace the crane for loading safety issues resulting in unavailable equipment for 5 days. After the analysis was conducted as shown in (figure 50), it was obvious that there was no effect on the critical path since the impact still have total float duration on it resulting on no delay effects on the total project completion date. Therefore, there are no delays to be entitled to any party.

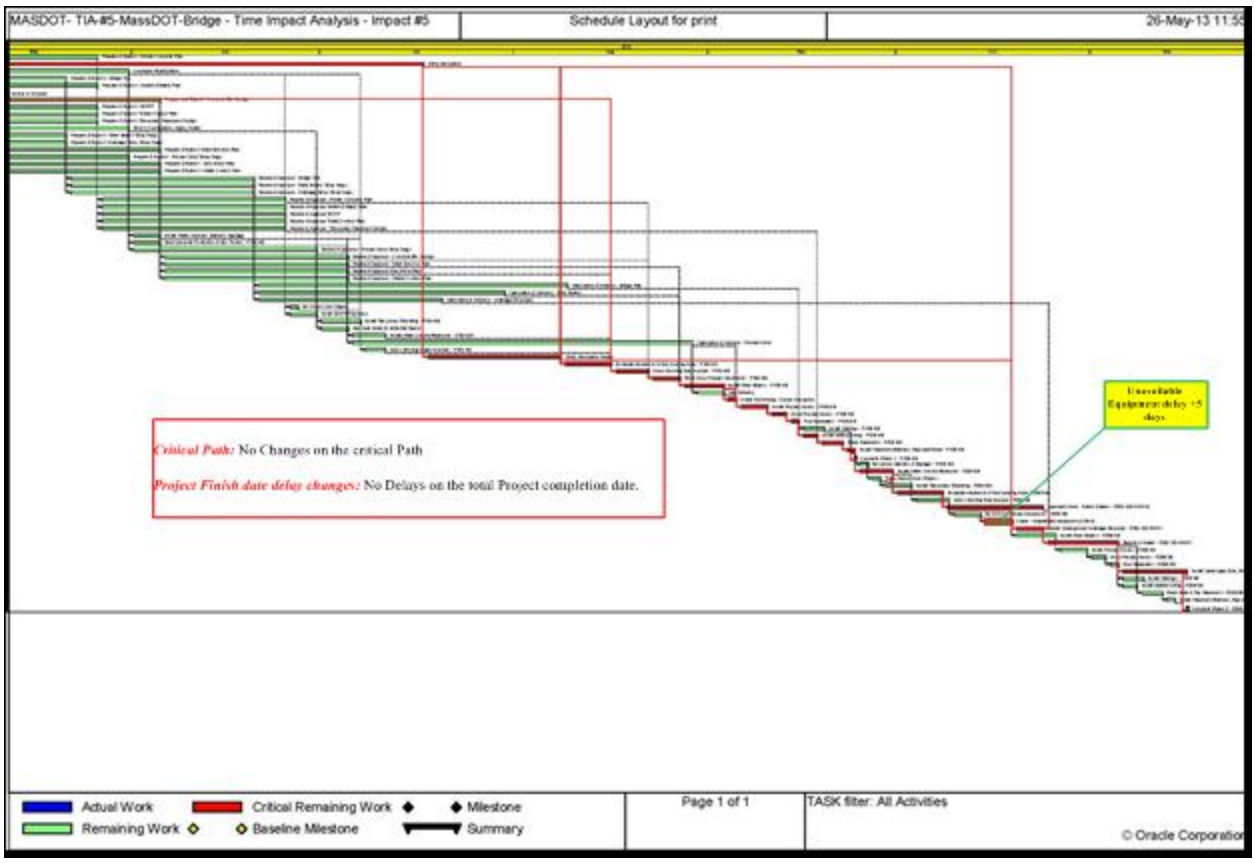


Figure 50. Impact #5

Impact # 6

The final impact is resulted from the unanticipated weather conditions causing the project to have 3 days of work stoppage delays. This particular impact was analyzed as shown in (figure 51).

According to the analysis based on figure 51, there were no major critical changes in the critical path and the total completion date was extended 3 days. Those 3 days are considerably excusable delays. However, the compensability issue can be debated and will be revisited and explained later in further detail in the cost analysis section.

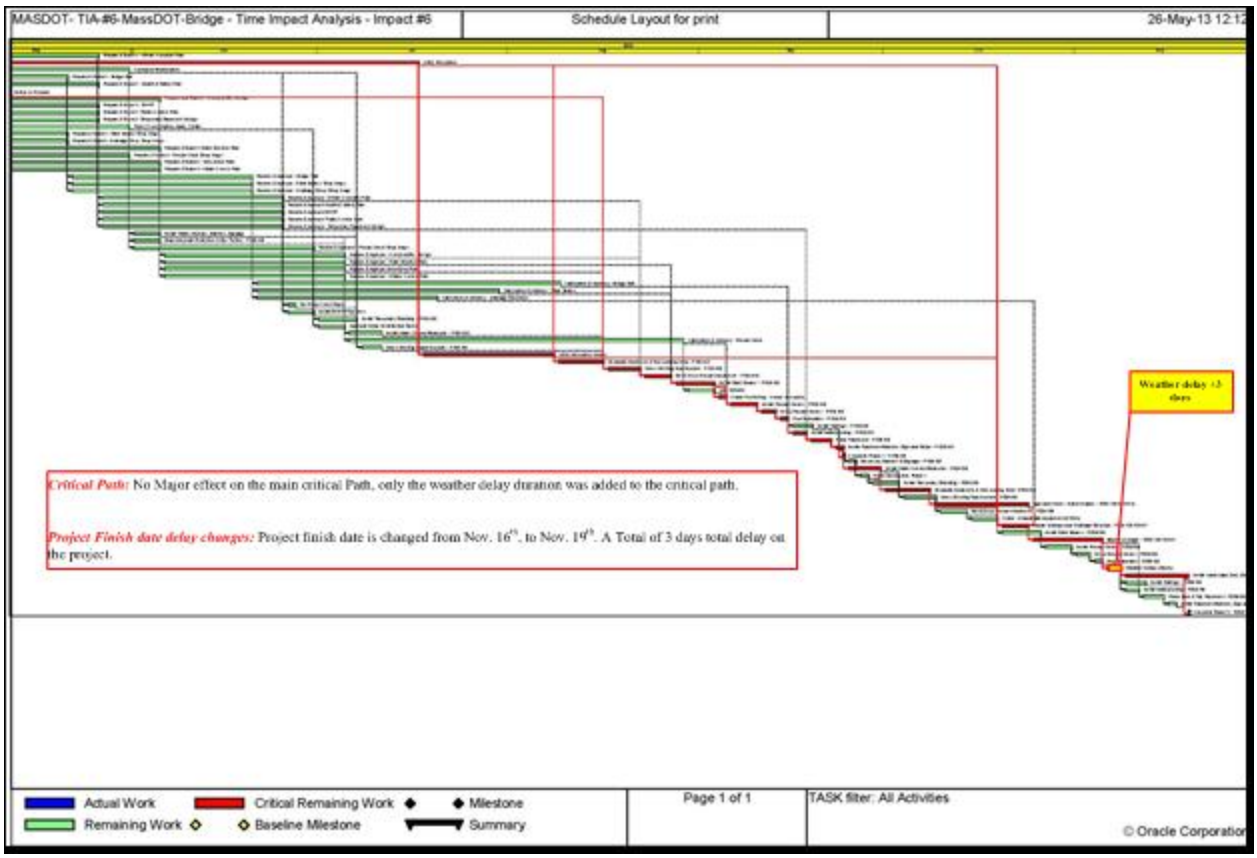


Figure 51. Impact #6

Claims Costs

To emphasize the costs associated with the delay claims along with establishing best practices for the cost calculations for the delays claim, the cost analysis was conducted using the previously mentioned scenario of calculation of costs. All the cost analysis will take the Time Impact analysis result into account since it is considered the most accurate best practices for scheduling analysis.

Labor Costs – *Labor wage escalation after 9th Nov. will require a claim for owner compensable delays that pushed the schedule into this period of wage escalation.*

1- Calculating Labor Burden %

2- Wage Escalation Calculation – due to the delays (after 9th Nov.)

Equipment Costs – *Relate to Disruption in Beam installation + Standby/Idle time during utilities relocation*

1- Standby/Idle Time

Material Costs – *Cost Escalation to delays after 9th Nov. will require a claim for owner compensable delays that pushed the schedule into this period of wage escalation.*

1- Material Cost Escalation

Overheads – *Relate all below to the delay*

1- SOH (GCs)

2- Additional Winter Conditions – due to delays

3- OOH – Different Formulas (Eichleay variation and Hudson formulas)

Lost Productivity Claims – Relate it to the disruption claim for steel beams.

1- Measured Mile Analysis

Labor Costs

Labor Costs based on the delay claim will address 2 main dependable labor cost calculations. The main issue in this case is to account for the wage escalation. This is because of the fact that the owner-related delays have pushed the duration of the project beyond the wage escalation boundary which begins at November 9th according to the case studs cost assumptions. The secondary calculation is the Labor burden percentage.

The following Labor Cost Calculations are based on the following assumptions:

1) Total Project Cost = $ 3,348,851
2) Employee related expenses = $256,000
3) Labor Cost % of total project Cost = 25%

There have been 10 days from November 9th when the wage escalations became effective up to November 19th where the project was completed. Based on this situation along with the aforementioned assumptions, the total additional labor costs were calculated.

Calculation of labor Costs in Claim							
Total Project Cost =	$ 3,348,851	Labor % =	25%				
Calculating Labor Burden Percentage %							
Details of work after 9th Nov.							
Activities		Crew Ref.	Labors No.	days	hrs.		
C880	Top Pavment placment	B-25	7	3	24		
C470	Install Landscaping, Sod, etc.	average	5	10	80		
C890	Install Pav. Markers, Sign & Stripe	B-78,79	4	2	16		
			Total Hrs.		120		
Employee related expenses =	$ 256,000		Total Labor Costs =		$ 837,213		
Labor Burden Percentage = Employee related Costs / (Total Labor Costs - Employee related Costs) =							***44.05%***
Wage Escalation Calculation							
Working hrs. after wage increase =	120	hrs.	anticipated rate =		$ 35.00		
			actual rate =		$ 40.00		
Difference between anticipated and actual rate =	$ 5.00						
Wage Escalation = Working hrs. after wage increas x difference of anticipated and actual rate =						$ 600	
Total Wage Escalation = Wage Escalation + Labor burden @			44.05%	***$ 864***			

Based on the Labor Cost analysis Calculations, A total additional labor cost of $ 864 was incurred for a delay claim entitlement.

Equipment Costs

The additional equipment costs in this case are related to the owner-caused delay (impact #4), where the owner disruption caused the crane erecting the steel beams to be standby/Idle for 2 days. All the costs associated will be related to the crane and the steel erection crew associated with that particular activity since it was the only activity affected by this kind of delay. The Equipment and steel erection crew was calculated as in the following.

Calculation of Equipment Costs in Claims						
Standby / Idle Time						
Standby / Idle time =	2	days	Working hrs. =		8	hrs./dy
Standby/Idle time =	16	hrs.				
Crew Daily Cost						
					Totals	
1	Struc. Steel Foreman @		$ 92.85	/hr.	$ 92.85	
5	Struc. Steel workers@		$ 89.30	/hr.	$ 446.50	
1	Equipment Operator @		$ 71.75	/hr.	$ 71.75	
1	Crane - 25 ton @		$1,100.00	/hr.	$ 1,100.0	
	Total Daily Crew Cost =		$1,711.10	/hr.	$ 1,711.1	
Total Entitlement for Idle Costs =			***$ 27,378***	***Labor - related***		***$ 8,630***
				Equip.- related		***$ 18,748***

From the equipment cost analysis, it is concluded that there is an additional cost of $ 27,378 allocated to this specific activity as a delay claim entitlement. This total additional cost can be divided into labor-related costs of $8,630 and an equipment related costs of $18,748. However, the labor related cost is still considered under the equipment costs since it is strictly related to the crane equipment.

Material Costs

Similar to the labor costs, the material costs in this case is facing a price escalation after Nov. 9th originated by owner-related delays. The material price escalation was original related to the Asphalt top pavement item (C880) which is phase 2 item in addition to several patching finishes. The analysis of this item price escalation was calculated as in the following.

Calculation of Material Costs in Claims						
Material Cost Escalation - Asphalt Top Pavement C880						
Quant. of material after the delay at escalated price =					1600	SY
		Price Orig. in time	Price after delay		Quant. (SY) After price inc.	
Material				Price Inc.		Add. Cost
Top Pavement		$ 17.00	$ 21.00	$ 4.00	1600	$ 6,400.00
				Total Material Escalation =		***$ 6,400.00***

According to this analysis, yet another price escalation item for delay claim entitlement will be added in the amount of $6,400 for the material price escalation.

Site Overhead (SOH)/General Conditions

The Site Overhead and general condition related to the construction work is directly related to any time extension. Therefore, all direct jobsite overhead had to be calculated in a daily form and then related to the duration entitled as in the following.

Calculation of Jobsite OH / General Conditions (GCs) Costs in Claims							
Item	**Rate**		**Daily rate**				
Field Office Trailer	$ 437	/ month	$ 14.57				
Tool & Storage Sheds	$ 450	/ month	$ 15.00				
Chemical Toilets	$ 380	/ month	$ 12.67				
Signs	$ 550	/ month	$ 18.33				
Job Communications	$ 450	/ month	$ 15.00				
Drinking Water	$ 50	/ month	$ 1.67				
Temp. Utilities	$ 500	/ month	$ 16.67				
Site Office Supplies	$ 400	/ month	$ 13.33				
Safety	$ 2,400	/ month	$ 80.00				
Photos	$ 335	/ month	$ 11.17				
Fencing	$ 670	/ month	$ 22.33				
Superintendent	$ 75	/ hr.	$ 600.00				
Project Manager	$ 75	/ hr.	$ 600.00				
2 Pick up Trucks	$ 25	/ hr.	$ 200.00				
	Total Site Overhead daily		***$ 1,621***	/ day			
No. of delay days =	**12**						
Total Entitlement for Extended Field Overhead= No. of delay extended days x Actual Cost/day =							***$ 19,449***

After the analysis for additional costs of site overhead, the results indicated an additional $19,449 in general conditions for the claimed delay duration.

Additional Winter Conditions Costs – Due to Owner delays

Another component that should be debated for entitlement is the additional costs due to the winter conditions. Although, unanticipated weather conditions are often treated as an excusable, non-compensable delay. In this particular case, the winter conditions should have not been encountered except for the owner caused delays (12 days) that pushed the schedule into those winter conditions. Therefore, additional costs due to an additional winter conditions should be calculated as in the following.

Additional Winter Conditions Costs - Due to owner delays			
	Original	**Cost after 3**	
Description	**Budget**	**add. Days**	***Add. Cost***
Wintr Conditions	15000	18000	3000
Temp. Heat	12000	14000	2000
Total- Winter related	**27000**	**32000**	5000
Total extended SOH	**$ 1,621**		
Total Winter Conditions duration =	**3**	days	
Total Added Cost for Winter Conditions & temp. heat =			***$ 9,862.20***

Home Office Overhead

The Home office overheads can be very debatable and it has many forms of calculations. There are three main formulas that will be calculated in this study. The formulas to be used for calculation are Eichleay formula, modified Eichleay formulas I & II and Hudson formula. These formulas were used in the HOO calculation as in the following and based on the following assumptions.

Calculation of HOO Costs in Claims

Company's Contract & Financial Data

Total Firm Revenue: (Original Period) =	$ 60,000,000	$ 60,000,000
Total Firm Revenue: (Actual Period) =	$ 75,000,000	$ 75,000,000
Original Contract Value =	$ 3,348,851	$ 3,000,000
Total Contract Value (before Claim)	$ 3,404,174	
Billings: (Original Period) =	$ 3,348,851	$ 3,000,000
Billings: (Actual Period) =	$ 3,404,174	$ -
Billings: Delay Period =	$ 55,323	$ (3,000,000)
Company OH: (Original Period) =	$ 3,942,000	$ 3,942,000
Company OH: (Actual Period) =	$ 5,692,500	$ 5,692,500
Total OH & Profit: Actual Period =	$ 7,312,500	

Planned Contract Duration =	176	Cal. Days
Actual Duration =	191	Cal. Days
Extended Duration =	15	Cal. Days
Owner-Caused Delay =	12	Cal. Days

Planned OH & Profit at Bid =	7.0%
Normal HOO percentage % =	4.5%
Actual HOO percentage % =	5.3%
Actual HOO%:Delay Period =	6.1%

Eichleay Formula :

OH Allocable to Contract = (Contract Billings / Total Billings for Actual Contract Period) X Total Company OH during Actual Contract Period = $ 258,377

OH Allocable to Contract/Day = OH Allocable to Contract / Actual Days of Contract Performance = $ 1,353 / Cal. day

HOO Owed due to Owner-Caused Delay = (Allocable OH / Cal.dy) X Owner-Caused delay period = ***$ 16,233***

Modified Eichleay Formula I:

OH Allocable to Contract = (Contract Billings / Total Billings for Original Contract Period) X Total Company OH during Original Contract Period = $ 223,654

OH Allocable to Contract/Day = OH Allocable to Contract / Original Days of Contract Performance = $ 1,271 / Cal. day

HOO Owed due to Owner-Caused Delay = (Allocable OH / Cal.dy) X Owner-Caused delay period = ***$ 15,249***

Modified Eichleay Formula II:

OH Allocable to Contract = (Contract Billings / Total Billings for Original Contract Period + Contract Billings for Extended Period) X Total Company OH during Original Contract Period = $ 223,448

OH Allocable to Contract/Day = OH Allocable to Contract / Original Days of Contract Performance = $ 1,270 / Cal. day

HOO Owed due to Owner-Caused Delay = (Allocable OH / Cal.dy) X Owner-Caused delay period = ***$ 15,235***

Hudson Formula:

OH Allocable to Contract/Day = (Original Contract Sum / Original Contract Period) X Planned HOO & Profit % = $ 1,332 / Cal. day

HOO Owed due to Owner-Caused Delay = (Allocable OH / Cal.dy) X Owner-Caused delay period = ***$ 15,983***

There are different results yielded from the different calculations using different formulas which again stress the need for standardization in delay claims management. However, this research will not recommend any of the above as best practices for home office overhead calculations since most of those formulas have several weaknesses as aforementioned in the Literature review section. For the purpose of costs associated with this item, the SOH will be taken as a close number to all the previous calculation which is a total of $ 15,000 for the whole compensable delay time “12 days”.

Productivity Losses

The productivity issue will be measured in this case for the delay claim associated with the disruption of the beam installation. In this case, the measured mile analysis method will be used since all the other methods were proven to be very inaccurate and were rejected consistently in several court cases as explained in the literature review section.

The beam installation disruption caused a loss in the productivity in the contractor in addition to the idle time that was experienced and calculate earlier. Assuming that this particular activity was supposed to install 16100 LF of steel beams and the impacted performance were limited to 6025 LF affected by the disruption. The productivity losses were calculated as in the following.

Measured Mile Performance (Before):					
Total wrk. hrs. for Beam Installation , Before Disruption				32	Wk. hrs.
Total LF of Steel Beams installed				10075	LF
Wk. hrs. per LF, measured mile				0.003	Wk. hrs./ LF
Impacted Performance (After):					
Total wrk. hrs. for Beam Installation , After Disruption				24	Wk. hrs.
Total LF of Steel Beams installed, after impacts				6025	LF
Wk. hrs. per LF, impacted				0.004	
Wk. hrs.Cost per hr. (including all burdens)				$238	
		Productivity (Wk.hr./ LF)	Quantity (LF)	Labor Cost/hr ($)	Total	
Actual Impacted		0.004	6025	$238	$ 5,712	
Should have been		0.003	6025	$238	$ 4,554	
Should have been Claim (Actual minus Should have been) =					***$ 1,158***

The result of the lost productivity analysis showed an additional cost of $ 1,158 that are related to the delay claim entitlement specific to this construction activity item.