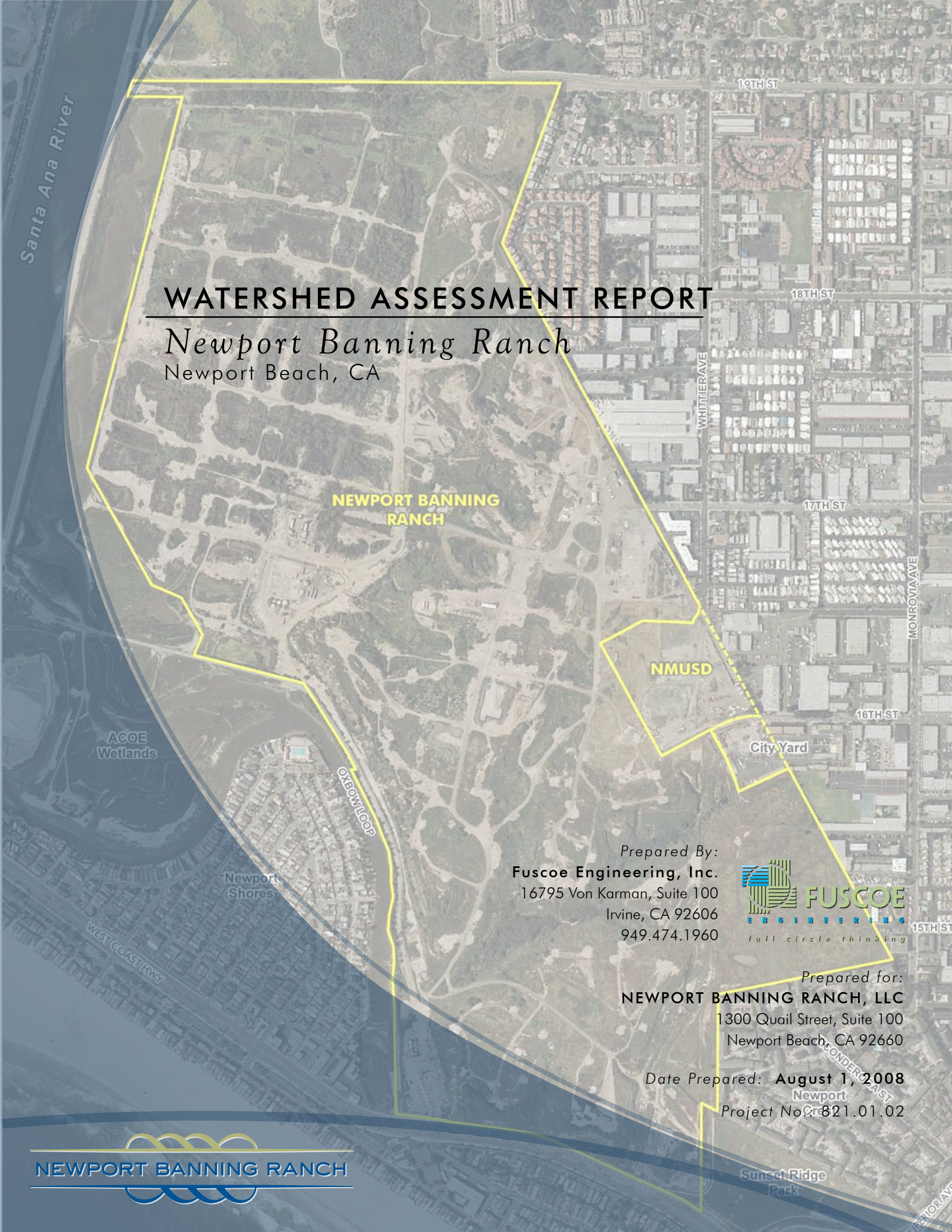
WATERSHED ASSESSMENT REPORT

Newport Banning Ranch

Newport Beach, CA



Prepared By:

Fuscoe Engineering, Inc.
16795 Von Karman, Suite 100
Irvine, CA 92606
949.474.1960

Prepared for:

NEWPORT BANNING RANCH, LLC
1300 Quail Street, Suite 100
Newport Beach, CA 92660

Date Prepared: **August 1, 2008**

Project No.: 821.01.02

NEWPORT BANNING RANCH

NEWPORT BANNING RANCH

WATERSHED ASSESSMENT REPORT

Design Applications for Hydrology, Flood Control, Water Quality, and Low Impact Development Features

City of Newport Beach, CA

Prepared for:

NEWPORT BANNING RANCH, LLC
1300 Quail Street, Suite 100
Newport Beach, CA 92660

By:

FUSCOE ENGINEERING, INC.
16795 Von Karman, Suite 100
Irvine, CA 92606

August 1, 2008

TABLE OF CONTENTS

Section **Page**

1.0 INTRODUCTION 1
1.1 PURPOSE OF STUDY 1
1.2 PROJECT AND SITE DESCRIPTION 1
1.2.1 Location 1
1.2.2 Existing Site Features 5
1.2.3 Existing Oil Operations 9
1.2.4 Proposed Development 9
1.3 STUDY OBJECTIVES 13
1.4 CEQA THRESHOLDS OF SIGNIFICANCE 14
2.0 SETTING 15
2.1 WATERSHED 15
2.2 RECEIVING WATER BENEFICIAL USES 15
2.3 EXISTING WATER QUALITY CONDITIONS 18
2.4 EXISTING DRAINAGE CONDITIONS 18
2.5 PROPOSED DRAINAGE PLAN 19
2.5.1 Proposed Storm Drains 19
2.5.2 Lowland Basin 20
2.5.3 Off-Site Runoff Water Quality / Detention Basin 20
2.6 FEMA SPECIAL FLOOD HAZARD AREAS 27
3.0 HYDROLOGY ASSESSMENT 29
3.1 METHODOLOGY 29
3.1.1 Rational Method 29
3.1.2 Small Area Unit Hydrograph Method 30
3.2 RESULTS & DISCUSSION 30
3.2.1 Lowland Mesa and Salt Marsh Area 30
3.2.2 Oxbow Loop 35
3.2.3 Caltrans Box Culvert at WCH 41
3.3 FLOODPLAIN INUNDATION ANALYSIS 45
3.3.1 Methodology 45
3.3.2 Results and Discussion 47
3.4 HYDROLOGY/HYDRAULICS IMPACT ASSESSMENT 57
4.0 WATER BUDGET ANALYSIS 61
4.1 SETTING 61
4.1.1 Arroyo Drainage Characteristics 61
4.1.2 Climate 67
4.2 METHODOLOGY 67

DRAFT

4.2.1 Water Budget Model 67
4.2.2 Surface Inflow 68
4.2.3 Evapotranspiration 69
4.2.4 Loss 69
4.3 RESULTS & DISCUSSION 70
4.3.1 Northern Arroyo 70
4.3.2 Southern Arroyo 71
5.0 WATER QUALITY ASSESSMENT 75
5.1 REGULATORY FRAMEWORK 75
5.1.1 Federal Regulations 75
5.1.2 State and Local Regulations 76
5.2 PREDICTED POLLUTANTS AND SOURCES 79
5.3 APPROACH 81
5.3.1 Construction Best Management Practices 82
5.3.2 Post-Construction Best Management Practices 83
5.3.3 Interior Water Quality Features 84
5.3.4 Transitional Phase Water Quality Features 87
5.3.5 Regional Natural Treatment Systems 97
5.4 WATER QUALITY IMPACT ASSESSMENT 98
6.0 EXHIBITS 103
7.0 TECHNICAL APPENDICES 109

DRAFT

EXHIBITS (INCLUDED IN SECTION 6)

Exhibit 1 Rational Method Hydrology Map For Proposed Condition
Exhibit 2 Rational Method Hydrology Map For Proposed Condition

FIGURES

Figure 1 Vicinity Map 3
Figure 2 Existing Site Features 7
Figure 3 Proposed Development 11
Figure 4 Existing Watershed 21
Figure 5 Proposed Watershed 23
Figure 6 Proposed Drainage Plan 25
Figure 7 Sub-Watershed Basins 33
Figure 8 Oxbow Loop Drainage 39
Figure 9 Caltrans Box Culvert 43
Figure 10 Northern Arroyo (100-Year & 2-Year) Floodplain 49

Figure 11 Southern Arroyo 100-Year Floodplain 53
Figure 12 Southern Arroyo 2-Year Floodplain 55
Figure 13 Habitat Drainage: Northern Arroyo 63
Figure 14 Habitat Drainage: Southern Arroyo 65
Figure 15 Landscape Biocell Typical Detail 91
Figure 16 Typical Front-Loaded LID Demonstration 95

TABLES

Table 2.1 Beneficial uses for downstream receiving waters. 16
Table 2.2 Water quality objectives for Santa Ana Region enclosed bays and estuaries. 17
Table 3.1 Existing condition runoff volume summary for Lowland and Salt Marsh basins. 31
Table 3.2 Proposed condition runoff volume summary for Lowland and Salt Marsh basins. ..32
Table 3.3 Existing condition hydrology summary for Oxbow Loop 36
Table 3.4 Proposed condition hydrology summary for Oxbow Loop 37
Table 3.5 Existing condition hydrology summary for Caltrans WCH Box Culvert 41
Table 3.6 Proposed condition hydrology summary for Caltrans WCH Box Culvert 41
Table 3.7 Discharge summary for Northern Arroyo used for HEC-RAS Models. 46
Table 3.8 Discharge summary for Southern Arroyo used for HEC-RAS Models. 46
Table 3.9 HEC-RAS modeling results for the Northern Arroyo. 47
Table 3.10 HEC-RAS modeling results for the Southern Arroyo, 2-Year event. 51
Table 3.11 HEC-RAS modeling results for the Southern Arroyo, 100-Year event. 52
Table 4.1 Drainage Area Summary of the Northern and Southern Arroyos 62
Table 4.2 Average monthly temperatures for the project area. 67
Table 4.3 Average monthly precipitation for the project area. 67
Table 4.4 Summary of surface runoff inflow factors. 68
Table 4.5 Summary of potential evapotranspiration. 69
Table 4.6 Water Balance under existing conditions of the Northern Arroyo. 70
Table 4.7 Water Balance under proposed conditions of the Northern Arroyo. 71
Table 4.8 Water Balance under existing conditions of the Southern Arroyo. 71
Table 4.9 Water Balance under proposed conditions of the Southern Arroyo. 72
Table 5.1 Anticipated and potential pollutants of concern for Project land use categories. ..79
Table 5.2 Summary of landscaping biocell water quality sizing options. 93
Table 5.4 Summary of landscaping biocell sizing examples. 94

DRAFT

TECHNICAL APPENDICES

APPENDIX A STUDY RELATED DOCUMENTS

A1 Salt Marsh Restoration Plan from USACOE

A2 FEMA Map

APPENDIX B HYDROLOGY CALCULATIONS

B1 Existing Condition Rational Method Calculations

B2 Proposed Condition Rational Method Calculations

B3 Existing Condition Small Area Unit Hydrograph Calculations

B4 Proposed Condition Small Area Unit Hydrograph Calculations

APPENDIX C HEC-RAS MODELING

C1 HEC-RAS Modeling Report for Northerly Arroyo Channel

C2 HEC-RAS Modeling Report for Southerly Arroyo Channel under Existing Condition

C3 HEC-RAS Modeling Report for Southerly Arroyo Channel under Proposed Condition

APPENDIX D WATER BUDGET ANALYSIS

D1 Northerly Arroyo under Existing Condition

D2 Northerly Arroyo under Proposed Condition

D3 Southerly Arroyo under Existing Condition

D4 Southerly Arroyo under Proposed Condition

D5 ET Reference Material

APPENDIX E BEST MANAGEMENT PRACTICES

E1 Site Design/LID BMPs

E2 Source Control BMPs

E3 LID / Treatment Control BMP Calculations

DRAFT

ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
AES	Advanced Engineering Software
BAT	best achievable technology
BCT	best conventional technology
BMP	best management practice
CDP	Coastal Development Permit
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulation
cfs	cubic feet per second
CWA	Clean Water Act
EIR	Environmental Impact Report
ET	evapotranspiration
EV	expected value
FEMA	Federal Emergency Management Association
FIRM	Flood Insurance Rate Map
GCP	General Construction Permit
HC	high confidence
HEC-RAS	Hydrologic Engineering Centers River Analysis System
HSA	Hydrologic Sub-Area
LID	low impact development
LIP	Local Implementation Plan
MEP	maximum extent practicable
MS4	municipal separate storm sewer system
MSL	mean sea level
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
OC DAMP	Orange County Drainage Area Management Plan
PAH	polycyclic aromatic hydrocarbons
RCB	reinforced concrete box
RCP	reinforced concrete pipe
RWQCB	Regional Water Quality Control Board

DRAFT

SFHA	Special Flood Hazard Area
SIC	standard industrial classification
SQDF	Storm Water Quality Design Flow
SQDV	Storm Water Quality Design Volume
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
Tc	time of concentration
TMDL	Total Maximum Daily Load
TPH	total petroleum hydrocarbons
TSS	total suspended solids
USACOE	United States Army Corps of Engineers
US EPA	United States Environmental Protection Agency
WCH	West Coast Highway
WDR	Waste Discharge Requirement
WQMP	Water Quality Management Plan

DRAFT