



# DETAILED ASSESSMENT REPORT



## Te Rapa Bypass

Version 1.5 Pilot Project

**PREPARED FOR**  
New Zealand Transport Agency

**DATE**  
10/7/2012



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## INTRODUCTION

Greenroads Foundation spoke with authorized representatives New Zealand Transport Agency (NZTA) on several occasions to discuss the Te Rapa Bypass Project for purposes of this Greenroads Pilot Project Assessment. The goal of the assessment is to determine the potential Greenroads Rating for the Te Rapa Bypass Project located in Hamilton, New Zealand. The Te Rapa Bypass Pilot Project is the second of several assessments included in the NZTA Greenroads Pilot Program.

## ABOUT THE ASSESSMENT

This Detailed Pilot Project Assessment summarizes our understanding of both Phases of the Project, the potential Greenroads Rating for each Phase, and our recommendations to the Project Team. More information on the process of Project Rating, eligibility, and segmentation of large projects is available in the *Greenroads Project Handbook* ([greenroads.org/files/244.pdf](http://greenroads.org/files/244.pdf)).

A brief description of the Greenroads Rating System is provided in Appendix A, the evaluation method used in this Assessment is attached in Appendix B, and the completed and annotated Greenroads Scorecards are located in Appendix C.

## ASSESSMENT OBJECTIVES

The specific objectives of this Detailed Pilot Project Assessment are to:

1. Understand the general intentions of the Project Team at NZTA.
2. Identify areas where the Project may achieve points based on Standard Project Documentation.
3. Identify other potential areas where the Project may achieve points.
4. Identify potential new ideas that can be considered as Custom Credits.

Using the information provided, a Greenroads Scorecard is completed for the Project that reflects the general state of the Project as well as its potential for certification.

## PROJECT DESCRIPTION

The Te Rapa Bypass Project will provide a northern connection to the City of Hamilton's western corridor and will support the rapid growth which is occurring in the north and north-western areas of the city.

The new route is a 6-kilometer bypass of the existing section of State Highway 1 between Hutchinson Road in Horotiu and Gilchrist Street, at the northern end of Avalon Drive near Wintec campus. The Project also includes the four-laning of Avalon Drive between Gilchrist Street and the Rotokauri Roundabout, at the northern end of the Avalon Drive Bypass.

## PROJECT REFERENCES

This Assessment was based on several web meetings with representatives of the Project Team and a brief review of the following Project documents:

- Contract No. NZTA 2/03-016/601 Waikato Expressway Te Rapa Section Project Alliance Agreement dated September 2009.
- Transit New Zealand: SH1 Te Rapa Bypass, Notice of Requirement dated January 2008.
- Transit New Zealand: SH1 Avalon Drive Bypass Stormwater Management System Project Review dated May 2008.
- SH1 Avalon Drive Bypass Stormwater Management System Comparison with Proposed NZTA Stormwater Treatment Standard Requirements dated October 2008.
- Best Practice Project Design Plan. Waikato Expressway – Te Rapa Section dated March 30, 2010.
- Roads of National Significance Economic Assessments Review dated July 2010.
- Waikato Expressway Te Rapa Section – Cross Drainage Culverts dated May 2010.
- Waikato Expressway Te Rapa Section – Cross Drainage Culverts Design Report dated July 2010.
- Operational Noise Mitigation Plan dated August 23, 2010
- Quality Management Plan Draft.
- Waste Management Plan Draft.
- Fulton Hogan ISO 9001:2008 certification.
- Opus International Consultants LTD ISO 9001:2008 certification.
- Draft Walking and Cycling Strategy, Te Rapa Bypass. New Zealand Transport Agency. Dated October 2009.
- Landscaping and Urban Design Masterplan.
- Te Rapa Bypass Investigation, Preliminary Geotechnical. Geotechnical Report No. 2307 dated May 7, 2004.
- Kaos Street Lighting Catalogue
- Te Rapa Alliance, AE-3 Context Sensitive Solutions documentation.
- Te Rapa Alliance, PR-1 Environmental Review Process documentation.
- Te Rapa Bypass Alliance – Organisational Structure dated April 2011.
- Pavement and Surfacing Summary – Avalon Drive dated July 13, 2011.
- Greenroads info for Pavement Use Avalon.xlsx
- Materials Cost and Distance.xlsx
- Re-use Recycle.xlsx
- <http://www.nzta.govt.nz/projects/te-rapa/overview.html>



## SCORE SUMMARY

A Greenroads Scorecard is attached that reflects our understanding of the Project intent and potential achievement level in Greenroads. A minimum of 32 points is required for certification. The highlights of the Scorecard are summarized below:

- The project has demonstrated intent to meet **7 of the 11 Project Requirements**.
- A total of **2 points do not appear to be practical** for Te Rapa Bypass to achieve due to the nature of the Project and would probably be considered inappropriate design choices.
- Te Rapa Bypass has demonstrated intent to meet **8 Voluntary Credits totaling 18 points**, with additional points possible for a few of these credits. This number of points does not meet the minimum requirements for a Certification award.
- **Eight credits were identified as economical opportunities to earn up to 16 additional points.** These credits are potentially feasible based on the documents provided and Greenroads believes are possible to implement with minimal to no additional construction cost, or will require minimal design team effort or time. These credits are in **boldface** in the scorecard. A few of these activities may actually be performed on the Project, but this was not clear in the reference documents for this report.
- **Twenty-two credits were identified as opportunities for Te Rapa Bypass to earn an additional 72 points;** however, the majority of these activities are likely to add substantial cost or require significant scope changes due to Phase II's current status. A few of these activities may actually be performed on the Project, but it was not clear in the reference documents for this report.
- **No Custom Credits were identified for this project.**



## CATEGORY SUMMARY

Figure 1 shows a summary of where points may be achieved with the current intent that has been shown and where economical additions may be made. This does not represent all achievable points, as the Project may already be on track to achieve points for credits that Greenroads staff has not seen documentation for. A majority of the submitted documents were more broadly scopes planning and policy documents. Many Greenroads credits require very specific project documents and even some post-construction as-built documents.

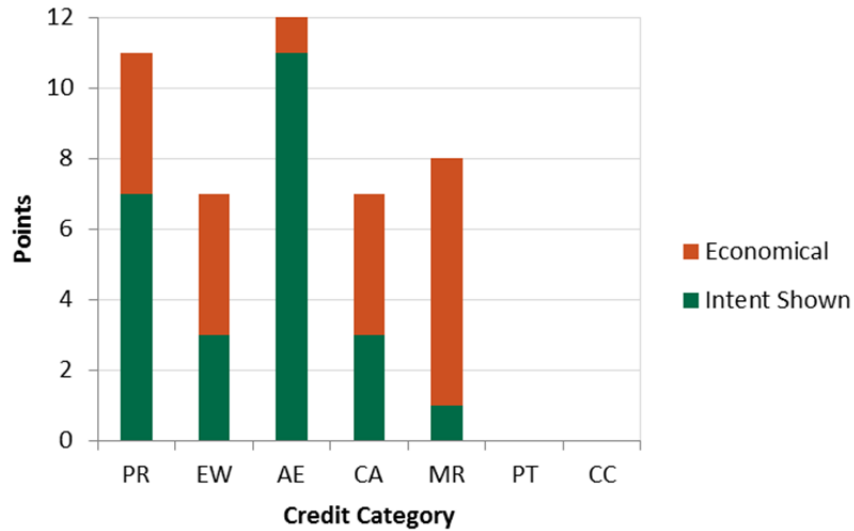


Figure 1. Te Rapa Bypass Project

## PROJECT REQUIREMENTS

The Te Rapa Bypass project appears to intend to meet 7 of the 11 Project Requirements.

- Specific credit documentation was not provided for review in this Assessment. For Certification, each of the 11 PR items would need to be documented completely in order to qualify for Certification Award.
- For the credits in which intent was not shown, the Project Team may need to make changes to ensure that all the Project Requirements are completed on the Project. If all Project Requirements are implemented early on the Project, Certification may not be feasible.

## ENVIRONMENT & WATER

Te Rapa Bypass demonstrated intent to achieve 3 points of a total 21 possible in the EW Category.

- The project showed the intent to achieve the Light Pollution credit.
- Drainage credits offer this Project a great opportunity to earn additional points depending on how the segment boundaries are defined. Documentation indicates Stormwater runoff will be treated but it was unclear how treatment will occur or to what extent.
- Stormwater cost analyses and site vegetation should also be considered easy options for additional points.

## ACCESS & EQUITY

Te Rapa Bypass demonstrated intent to meet 11 points of a total 30 possible in the AE Category.

- A majority of the points come from the inclusion of Context Sensitive Solutions and the installation of new bicycle and pedestrian facilities.
- The project has indicated the intent to perform safety audits on the Project.
- The project could potentially add points at a low cost by including facilities that draw attention to the nearby historical and cultural lwi sites.

## CONSTRUCTION ACTIVITIES

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Te Rapa Bypass demonstrated intent to meet 3 points of a total 14 possible in the CA Category.

- Documentation indicates that recycling will be done and that a Waste Management Plan will be used. The Waste Management Plan should be expanded to include the recycling as well to earn this point.
- CA-2 Environmental Training, CA-6 Paving Emissions Reduction, and CA-7 Water Use Tracking should be considered as an easy option for the Project to earn points.

## MATERIALS & RESOURCES

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Te Rapa Bypass demonstrated intent to meet 1 point of a total 23 possible in the MR Category. Materials choices have an enormous impact on lifetime energy and emissions associated with the Project. Additional points are likely to be available for higher levels of effort in this category.

- Documentation indicated that at least 50% of the existing project pavement will be re-used and that the remaining will be recycled. Calculations should be completed to confirm that the re-use percentage isn't higher and thus deserving additional credit. It could not be determine if the Project deserves points for recycling, as calculations were not shown to determine how much of the new pavement materials will be from recycling.
- Documentation also indicated that many materials will be sourced locally, but it could not be determined if the amount shown would merit points for the Regional Materials credit. Additional calculations are required.
- Diligent tracking of recycled content, reused materials, and materials suppliers and sources will be important for the Project.

## PAVEMENT TECHNOLOGIES

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Te Rapa Bypass did not demonstrate intent to earn any of a total 20 possible in the PT Category.

- Long-life pavement may be achieved with the current pavement design. Calculations should be done to see if the Project is already deserving of these 5 points.

## CUSTOM CREDITS

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No Custom Credits were identified for Te Rapa Bypass. Several Custom Credits have been recently developed that may or may not be appropriate for this Project.

Some Custom Credits that may be applicable for this Project, or future similar projects, are:

- Freight Access
- Pavement Smoothness
- Native Revegetation (potentially an alternate to EW-6 Habitat Restoration)
- Educated Professionals
- Alternative Energy
- Low Emitting Materials
- Workzone Safety

## DISCUSSION

Based on our understanding of the intent of the Project Team, it appears a minimum rating of **Greenroads Bronze** could be reasonably achieved with some additional effort. A **Silver Rating** is also likely to be within reach since credit specific documents were not reviewed, but is likely to be more challenging.

To achieve a certification award, all activities must be formally documented according to the current version of the *Greenroads Manual*. Importantly, all of the Project Requirements must be completed and documented. Due to the current stage of the Project, it may be difficult to pursue further recognition. **At this time, Greenroads does not recommend Certification is pursued for Te Rapa Bypass.**

## HOW THIS PROJECT COMPARES

The Te Rapa Bypass project scores about average compared to other typical highway projects. Generally, most projects complete between 4-7 Project Requirements and earn between 15-25 points in Voluntary Credits. These statistics are based on a sample of about 120 projects from across the U.S. and Canada that use current best practices and design standards and were built within the last 10 years. Table 1 shows how Your Project compares to other projects within this sample set based on some of the descriptive characteristics of the project.

**Table 1. Project's Rating Position Compared to Other Projects**

<b>Your Project</b>		<b>Score (w/o CC)</b>	<b>Rating</b>	
Te Rapa Bypass		18	None	
<b>Your Project's Reasonable Potential</b>				
Te Rapa Bypass		34	Bronze	
	<b>No. Projects</b>	<b>Score (w/o CC)</b>	<b>Rating</b>	<b>Rating Range</b>
<i>US Projects</i>	120	25 ± 1	None	None
<i>US Projects Reasonable Potential</i>	120	59 ± 17	Gold	Bronze – Evergreen
<i>Greenroads Projects Certified to Date</i>	4	40 ± 6	Bronze	Bronze – Silver
<i>DBB Projects</i>	98	25 ± 1	None	None
<i>Alternative Delivery Projects</i>	22	31 ± 2	None	None – Bronze
<i>Urban Projects</i>	40	28 ± 1	None	None
<i>Projects with Budgets &gt;\$100 mil</i>	18	32 ± 2	Bronze	None – Bronze
<i>Projects with Sustainability Emphasis</i>	37	29 ± 1	None	None

Based on other project experience, Te Rapa Bypass has two characteristics that are commonly helpful to position the project to be successful at sustainability:

- Projects that use **alternative contracting approaches**, such as the alliance structure used for Te Rapa Bypass, tend to outperform conventional design-bid-build projects.
- **Large budget projects (more than \$10 million USD)** also typically have significant financial leverage to do more sustainable activities. Much of this has to do with the amount of social capital required to move the Project forward in a community.



## POTENTIAL ADAPTATION NEEDS

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One goal of the NZTA Pilot Program is to understand what, if any, variations in local regulations exist between the United States and New Zealand. U.S. environmental and social regulations form the foundational concepts in the current version of the Greenroads Rating System, and may not be appropriate to apply in the context of New Zealand without adaptation or additional recognition of regional standards of practice.

The results of this Detailed Pilot Project have provided valuable information on how Greenroads can apply to New Zealand projects.

- In general, a more detailed analysis is needed for certain credits than others.
- For the submitted documents, it appears that New Zealand design and construction standards align well with the existing Greenroads credit requirements. However, while standard project documents provide excellent information to fulfill the purpose of a Pilot Assessment, these documents do not often meet the explicit documentation criteria included in each Greenroads credit. For formal Project Certification, it is likely that special documentation (i.e. a short narrative describing the activity) would either be provided to Greenroads or that Greenroads credit would be more clearly embedded into the standard documentation, such as through the specifications.
- A greater understanding of some typical New Zealand design and construction practices could help determine whether the current Greenroads credits can be achieved. For example, not enough information was available for EW-2 Runoff Flow Control and EW-3 Runoff Quality to determine if New Zealand's stormwater management practices meet Greenroads requirements. Specifically, stormwater regulations in the U.S. have also become more stringent recently with the broader encouragement of low impact development techniques. It is not clear if New Zealand environmental regulations meet these standards that are set by the U.S. Environmental Protection Agency.
- It is unclear if New Zealand projects will have any special difficulty with completing the current set of 11 Project Requirements because documentation was not available on this Project to address all of them.

## RECOMMENDATIONS FOR FUTURE PROJECTS

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There are numerous design opportunities that should be considered throughout design and construction decision-making that may be helpful in positioning future projects for successful certification that are similar in size, purpose and nature to Te Rapa Bypass. For this Project and most projects, additional sustainability opportunities appear to be available in the areas of increased environmental stewardship in design and creative materials management.

Below are some specific recommendations for the Project Team:

1. As with this project, we recommend that the 11 Greenroads Project Requirements are addressed early in project planning and design. Incorporating Project Requirements PR-4 through PR-7 into the specifications and technical drawings is an excellent way to ensure that they will be completed.
2. Often the greatest potential to earn points involves considering stormwater management beyond completion of construction. For this project, there was not enough information to determine accurately whether these activities are being done. Generally, the Environment & Water category offers a huge potential for reducing environmental impacts over the life of roadway projects.
3. Materials management often provides great opportunities for innovation and cost savings, especially with increased use of recycled materials, reused site materials, and creative waste management activities.
4. This Project did not identify any Custom Credit opportunities. A sample of Custom Credit ideas on record with Greenroads are listed in the latest version of the Errata for the *Greenroads Manual*.

## LIMITATIONS OF ASSESSMENT

- Documents provided were not reviewed for detailed compliance with specifications in the *Greenroads Manual*.
- The results and recommendations provided in this study are only applicable to the version of the Rating System used to complete this assessment: *Greenroads Manual v1.5* (dated February 4, 2011).
- This project is very large and complex. The resulting scores of this assessment may not apply to the whole project and may not accurately reflect actual certification scores for certain parts of the Project where features are discontinuous. For certification, a Certification Plan would be required. The purpose of a Certification Plan is to determine how to certify the Project most cost-effectively by identifying which activities apply sitewide and which are specific to certain segments.
- The reported score is not intended to be interpreted as an actual earned Rating, completed Certification review, or Registration of this project. Rather, the score reflects the current potential score of the Project based on the documents provided for our review and verbal conversation with the Project Manager and other representatives of the Project Team. Successful completion of a Pilot Project Assessment does not indicate that the Project is Certified.
- The completed Scorecard is intended to serve as guidance and as a learning tool for the Project Team and may be publicized in accordance with the Greenroads Trademark & Copyright Policy as a “Pilot Project.” However, under no circumstances shall any Project Team member claim that this project has been certified by Greenroads Foundation as a result of this Assessment.
- Greenroads respects reasonable requests for confidentiality, and reserves the right to publish, distribute or otherwise use such confidential project data to assess the Project in aggregate with other projects, without exposing any distinguishing information about the Project’s identity.

# APPENDIX A

About the Greenroads Rating Program



## BACKGROUND

The Greenroads® Rating System is a collection of sustainability best practices, called “credits,” that apply to roadway design and construction, much like the Leadership in Energy and Environmental Design (LEED®) Rating Systems for green buildings. Completing these activities can earn points toward a total score, called a “Rating,” that can be used as an indicator of the overall sustainability of the project.

A **Greenroad** is defined as roadway project that has been designed and constructed to a level of sustainability that is substantially higher than current common practice.

The Greenroads Project Rating Program is one of three charitable programs for transportation infrastructure administered by the 501(c)(3) non-profit organization, Greenroads Foundation. The Project Rating Program includes two core services for projects to get a Greenroads Rating: Project Certification and Project Assessment.

Certification is a rigorous, independent, third-party review of project documentation according to the standard in the most current *Greenroads Manual*. The Certification process is intended to be somewhat challenging in order to recognize projects that go far beyond the conventional practice for sustainable design and construction. Projects that successfully complete the Certification process are eligible for Certification Award and recognition as a “Greenroad.”

Greenroads Assessments are less stringent and shorter turnaround: they rely on standard project documentation at-hand and are used most often as stepping stones on the path to certify a project in the future. Assessments are also used for completed projects as a benchmarking tool and for all projects located outside of the United States as part of Greenroads Pilot Program efforts.

Since 2007, Greenroads has been tested on over 125 design and construction projects around the world of various types, shapes, sizes and stages of design and construction. Projects from all over the United States and internationally are participating in the Greenroads Project Rating Program and joining the Foundation in its efforts toward making our transportation infrastructure more sustainable.

## RATING SYSTEM DETAILS

Greenroads sustainability credits are divided into two types: mandatory and voluntary. Projects pursuing Certification must complete 11 mandatory credits (Project Requirements) in order to qualify for a Certification Award. There are 37 other Voluntary Credits that when complete, earn points toward one of four Certification Awards: Bronze, Silver, Gold and Evergreen.



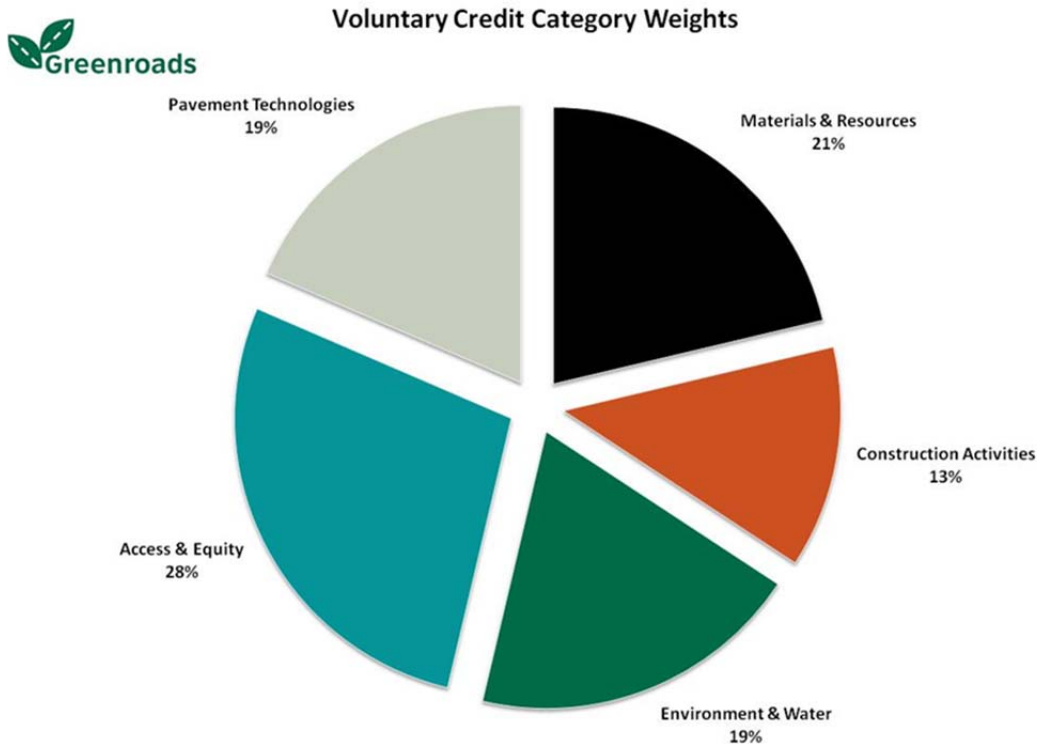
Credits are grouped into six Categories, with one additional Category that allows projects to earn points for innovative activities that are currently not recognized in the Rating System.

### Important Notes

- Mandatory activities (Project Requirements) are not worth points
- All 11 Project Requirements must be completed to be eligible for a Certification Award
- Voluntary activities (all other credits) are worth between 1 to 5 points based on lifecycle impact

**Table 1. Greenroads Credit Categories and Intent**

Category Name	Intent
<b>Project Requirements</b>	Encourage environmentally responsible decision-making processes, have management plans in place for construction, establish a minimum baseline for every project that applies for certification.
<b>Environment &amp; Water</b>	Promote best practices related to stormwater management and ecological resources within the project boundary
<b>Access &amp; Equity</b>	Promote safety, access, and mobility improvements and features for users and operations of the roadway
<b>Construction Activities</b>	Promote responsible construction management, reduce use of fossil fuels and improve health and safety of construction workers
<b>Materials &amp; Resources</b>	Promote responsible materials and energy management by combinations of recycling, reusing, and reducing both virgin and waste materials
<b>Pavement Technologies</b>	Highlight specific pavement engineering innovations and ideas or broad types of technologies or techniques which are well-established in practice and have direct sustainability benefits
<b>Custom Credits</b>	Recognize the implementation of sustainable or innovative ideas not included in the current version of the Rating System.


**Figure 1. Relative Weights of Greenroads Credit Categories (108 Points Possible, Does Not Show Custom Credits)**

## MORE INFORMATION

More detailed information, including the full and abridged versions of the *Greenroads Manual*, which details the activities that are part of the Rating System, and the *Project Handbook*, which describes the details of the Project Rating Program, can be found on the Greenroads Website: <http://www.greenroads.org>.



## CREDIT SUMMARY

The Greenroads Rating System v1.5 *Manual* has:

- 11 Project Requirements.
- 37 Voluntary Credits. 1 to 5 points each, 108 maximum possible.
- 118 total maximum points including 10 points for optional Custom Credit activities.

## PROJECT REQUIREMENTS

To be eligible for a Certification Award, all 11 Project Requirements must be completed and documented. There are no points for any of these activities.

No.	Title	Pts.	Description
PR-1	Environmental Review Process	Req	Complete a comprehensive environmental review
PR-2	Lifecycle Cost Analysis (LCCA)	Req	Perform LCCA for pavement/bridge section
PR-3	Lifecycle Inventory (LCI)	Req	Perform LCI of pavement/bridge materials
PR-4	Quality Control Plan	Req	Have a formal contractor quality control plan
PR-5	Noise Mitigation Plan	Req	Have a construction noise mitigation plan
PR-6	Waste Management Plan	Req	Have a plan to divert C&D waste from landfill
PR-7	Pollution Prevention Plan	Req	Have a TESC/SWPPP
PR-8	Low Impact Development (LID)	Req	Complete a LID feasibility study
PR-9	Pavement Management System	Req	Have a pavement/bridge management system
PR-10	Site Maintenance Plan	Req	Have a roadside maintenance plan
PR-11	Educational Outreach	Req	Publicize sustainability information for project

## ENVIRONMENT & WATER

No.	Title	Pts.	Description
EW-1	Environmental Management System	2	ISO 14001 certification for general contractor
EW-2	Runoff Flow Control	1-3	Reduce runoff quantity
EW-3	Runoff Quality	1-3	Treat stormwater to a higher level of quality
EW-4	Stormwater Cost Analysis	1	Conduct an LCCA for stormwater elements
EW-5	Site Vegetation	1-3	Use native low/no water vegetation
EW-6	Habitat Restoration	3	Restore habitat beyond what is required
EW-7	Ecological Connectivity	1 or 3	Connect habitat across roadways
EW-8	Light Pollution	3	Discourage light pollution

## ACCESS & EQUITY

No.	Title	Pts.	Description
AE-1	Safety Audit	1-2	Perform roadway safety audit
AE-2	Intelligent Transportation Systems (ITS)	2-5	Implement ITS solutions
AE-3	Context Sensitive Solutions	5	Plan for context sensitive solutions
AE-4	Traffic Emissions Reduction	5	Reduce emissions with quantifiable methods
AE-5	Pedestrian Access	1-2	Provide/improve pedestrian accessibility
AE-6	Bicycle Access	1-2	Provide/improve bicycle accessibility
AE-7	Transit Access	1-5	Provide/improve transit accessibility
AE-8	Scenic Views	1-2	Provide views of scenery or vistas
AE-9	Cultural Outreach	1-2	Promote art/culture/community values

**For credit details, including documentation requirements, visit [greenroads.org/manual](http://greenroads.org/manual).**

## CONSTRUCTION ACTIVITIES

No.	Title	Pts.	Description
CA-1	Quality Management System	2	ISO 9001 certification for general contractor
CA-2	Environmental Training	1	Provide environmental training
CA-3	Site Recycling Plan	1	Have a plan to divert waste from landfill
CA-4	Fossil Fuel Reduction	1-2	Use alternative fuels in construction equipment
CA-5	Equipment Emissions Reduction	1-2	Meet EPA Tier 4 standards for non-road equip.
CA-6	Paving Emissions Reduction	1	Use pavers that meet NIOSH requirements
CA-7	Water Tracking	2	Develop data on water use in construction
CA-8	Contractor Warranty	3	Warranty on the constructed pavement

## MATERIALS & RESOURCES

No.	Title	Pts.	Description
MR-1	Life Cycle Assessment (LCA)	2	Conduct a detailed LCA of the entire project
MR-2	Pavement Reuse	1-5	Reuse existing pavement sections
MR-3	Earthwork Balance	1	Use native soil rather than import fill
MR-4	Recycled Materials	1-5	Use recycled materials for new pavement
MR-5	Regional Materials	1-5	Use regional materials to reduce transportation
MR-6	Energy Efficiency	1-5	Improve energy efficiency of operational systems

## PAVEMENT TECHNOLOGIES

No.	Title	Pts.	Description
PT-1	Long-Life Pavement	5	Design pavements for long-life
PT-2	Permeable Pavement	3	Use permeable pavement as a LID technique
PT-3	Warm Mix Asphalt (WMA)	3	Reduce production energy at plant for binders
PT-4	Cool Pavement	5	Contribute less to urban heat island effect (UHI)
PT-5	Quiet Pavement	3	Use a quiet pavement to reduce noise
PT-6	Pavement Performance Tracking	1	Relate construction to performance data

## CUSTOM CREDITS

Up to 10 submittals for Custom Credits are allowed for all projects. Points for each credit range from 1 to 5 points, up to a maximum of 10 points possible to be earned on any project.

No.	Title	Pts.	Description
CC-1	Custom Credit 1	1-5	Design a new voluntary credit
CC-2	Custom Credit 2	1-5	Design a new voluntary credit

## CERTIFICATION AWARD LEVELS

Level	Project Requirements	Minimum Pts.	Maximum Pts.	% of Voluntary Credits Achieved
Bronze	11	32	42	30-39
Silver	11	43	53	40-49
Gold	11	54	63	50-59
Evergreen	11	64	118	60+

For credit details, including documentation requirements, visit [greenroads.org/manual](http://greenroads.org/manual).

# APPENDIX B

Scoring Method



## BASIC ASSESSMENT – STANDARD SCORECARD

The Greenroads Standard Scorecard (simply “Scorecard”) is completed using the approaches described below for Project Requirements, Voluntary Credits and Custom Credits.

### PROJECT REQUIREMENTS

**Project Requirements** are evaluated based on the intent shown by actual Project documents or by verbal confirmation of intent. If clear intent is present, the Scorecard shows an “x” in the “Y(es)” column. If not, the “x” is placed in the “?” column. By design, it is *possible* to complete all 11 Project Requirements, so none will receive an “x” in the “N(o)” column. We recognize that this perspective is optimistic and that special constraints or local requirements may make some activities more difficult or onerous to document if certification is pursued.

- Demonstrating intent to complete a Project Requirement is sufficient for the purposes of this review. Most, if not all, Project Requirements can be addressed early in project decision-making. However, the complete documentation for all Project Requirements would be required if any future certification is to be pursued.
- For projects that are finalizing design or in construction at the time Greenroads is considered, it may be difficult or simply cost-prohibitive to meet the documentation requirements for certification (if desired). However, the goal of this review is to demonstrate the maximum project potential so that credits can be considered next time.
- Project Requirements carry no point value and do not add or subtract from the total score.

### VOLUNTARY CREDITS

**Voluntary Credits** are evaluated based on the intent shown by actual Project documents or by verbal confirmation of intent. If clear intent is present, the Scorecard shows a number in the “Y(es)” column for the number of points achieved. If not, a number is placed in the “?” column, meaning that many points could be considered as feasible for the Project. A number for the remaining points is placed in the “N(o)” column only if those points would not be reasonable or practical for the Project based on known constraints and scope.

- Demonstrating intent alone to complete Voluntary Credits is sufficient for purposes of this review. This is because the elected Voluntary Credits can often change throughout the design and construction process and the purpose of this assessment is to demonstrate a potential score. Again, the approach used makes the required documentation needs very transparent for future certification efforts while also highlighting notable opportunities.
- Credits marked as “Y” or “?” in bolded text could potentially reduce cost or be completed at minimal or no additional cost to the initial construction price.
- Voluntary Credits carry a variety of values and range from 1 to 5 points. Please refer to the *Greenroads Manual* for further details on how Voluntary Credits are weighted.

### CUSTOM CREDITS

Potential **Custom Credits** are evaluated similarly to the Voluntary Credits, but typically these are verbally described activities instead of documented activities. Custom Credits are submitted by registered projects pursuing certification and subjected to rigorous review prior to their approval for broad use in other projects. For purposes of this assessment, the Scorecard shows short titles that represent the basic concept of proposed Custom Credits as well as an estimated number of points. Points for Custom Credits are assigned according to the existing weighting scheme used in the *Greenroads Manual*.

## DETAILED ASSESSMENT – ANNOTATED SCORECARD

An annotated version of the Standard Scorecard is provided for Detailed Assessments and Detailed Pilot Projects. The purpose of the Annotated Scorecard is to add depth to the information provided in the Standard Scorecard.

### EFFORT TO COMPLETE

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Greenroads estimates the level of effort that is anticipated or perceived to be needed to complete and document the credit given the context of the Project. The “Effort to Complete” section on the Annotated Scorecard reflects this estimate of effort the credit were to be pursued during Project Certification.

Specifically, Greenroads defines “effort” needed in the context of Project Certification by any of the following.

- Amount of documentation required by Greenroads
- Amount of time to provide and generate documentation that is in addition to standard project documentation
- Amount of resources that may or may not be physically available or accessible to complete a task, implement a technology or practice, or to document them
- Amount of money involved in earning and documenting a Greenroads credit
- Conflicts with existing regulatory standards, if any
- Conflicts with implementing Greenroads credits in the design process, if any
- Conflicts with implementing Greenroads credits in the construction process, if any
- Any learning curve that might be associated with a particular credit, requiring additional time investment

### Scale

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Effort is evaluated on a scale of low to high, and credits which were not appropriate or applicable to a particular project are marked as “N/A”. For Project Requirements, an “X” is used to indicate associated effort. For Voluntary Credits, points are shown according to their relative difficulty to achieve and their applicable point spread according to the *Greenroads Manual*.

### Educated Estimate

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The estimate of effort is based on our understanding of the Project, the existing research for a particular credit, experience with other projects, and the demonstrated intent to complete the credit based the stated goals of the Project Team in conversation or as otherwise demonstrated in documents provided for the Assessment.

However, estimated points in the Annotated Scorecard or the Standard Scorecard may not reflect actual Project conditions or its position for successful certification because documentation reviewed for Assessment purposes is limited. The estimates provided by Greenroads in no way imply that the Project *will* earn any particular credit and the information shown in the Scorecards should not be presumed to be a guarantee or statement of future approval under any circumstances.

### NOTES

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Specific comments about each credit are provided by the Greenroads Reviewer indicating where the intent was identified in the provided documents (if any) and some special comments regarding the credit for the Project Team to consider. This section does not influence the final computation of Greenroads Rating.



## APPENDIX C

Greenroads Scorecards





Project Name  
 Location (City, State)  
 Project Manager  
 Project Budget  
 Current Status (Circle)

12NZ00001 Te Rapa Bypass  
 Hamilton, New Zealand  
 Robert Mitchell  
 168.0 million (USD)  
 Construction

Project Requirements (PR)		PR Max: 11	7	4	0
No.	Title		Y	?	N
PR-1	Environmental Review Process	Req	x		
PR-2	Lifecycle Cost Analysis	Req		x	
PR-3	Lifecycle Inventory	Req		x	
PR-4	Quality Control Plan	Req	x		
PR-5	Noise Mitigation Plan	Req	x		
PR-6	Waste Management Plan	Req	x		
PR-7	Pollution Prevention Plan	Req		x	
PR-8	Low-Impact Development	Req	x		
PR-9	Pavement Management System	Req	x		
PR-10	Site Maintenance Plan	Req	x		
PR-11	Educational Outreach	Req		x	

Environment & Water (EW)		EW Max: 21	3	18	0
No.	Title		Y	?	N
EW-1	Environmental Management System	2		2	
EW-2	Runoff Flow Control	1 - 3		3	
EW-3	Runoff Quality	1 - 3		3	
EW-4	Stormwater Cost Analysis	1		1	
EW-5	Site Vegetation	1 - 3		3	
EW-6	Habitat Restoration	3		3	
EW-7	Ecological Connectivity	1 - 3		3	
EW-8	Light Pollution	3	3		

Access & Equity (AE)		AE Subtotal: 30	11	17	2
No.	Title		Y	?	N
AE-1	Safety Audit	1 - 2	2		
AE-2	Intelligent Transportation Systems	2 - 5		5	
AE-3	Context Sensitive Solutions	5	5		
AE-4	Traffic Emissions Reduction	5		5	
AE-5	Pedestrian Access	1 - 2	2		
AE-6	Bicycle Access	1 - 2	2		
AE-7	Transit & HOV Access	1 - 5		3	2
AE-8	Scenic Views	2		2	
AE-9	Cultural Outreach	1 - 2		2	

Construction Activities (CA)		CA Max: 14	3	11	0
No.	Title		Y	?	N
CA-1	Quality Management System	2	2		
CA-2	Environmental Training	1		1	
CA-3	Site Recycling Plan	1	1		
CA-4	Fossil Fuel Reduction	1 - 2		2	
CA-5	Equipment Emission Reduction	1 - 2		2	
CA-6	Paving Emission Reduction	1		1	
CA-7	Water Use Tracking	2		2	
CA-8	Contractor Warranty	3		3	

Materials & Resources (MR)		MR Max: 23	1	22	0
No.	Title		Y	?	N
MR-1	Lifecycle Assessment	2		2	
MR-2	Pavement Reuse	4 - 5	1	4	
MR-3	Earthwork Balance	1		1	
MR-4	Recycled Materials	1 - 5		5	
MR-5	Regional Materials	1 - 5		5	
MR-6	Energy Efficiency	5		5	

Pavement Technologies (PT)		PT Max: 20	0	20	0
No.	Title		Y	?	N
PT-1	Long-Life Pavement	5		5	
PT-2	Permeable Pavement	3		3	
PT-3	Warm Mix Asphalt	3		3	
PT-4	Cool Pavement	5		5	
PT-5	Quiet Pavement	2 - 3		3	
PT-6	Pavement Performance Tracking	1		1	

Custom Credit (CC)		CC Max: 10	0	0	10
No.	Title		Y	?	N
CC-1		1 - 5			
CC-2		1 - 5			
CC-3		1 - 5			

<b>All 11 PR Met?</b>			<b>No</b>		
<b>Greenroads Total (Max 118)</b>			<b>18</b>	<b>88</b>	<b>12</b>



Project Name 12NZ00001 Te Rapa Bypass  
 Location (City, State) Hamilton, New Zealand  
 Team Manager Robert Mitchell  
 Project Budget \$168 million  
 Current Status Construction

The "Intent" category shows if documents were provided that demonstrates the project intends to meet the goal of a credit.

The "Effort" category indicates the amount of effort (in time or documentation) the reviewer believes will be required for the project achieve a credit.

Project Requirements (PR)			Intent		Effort to Complete				Notes
No.	Title		Yes	No	Low	Med	High	N/A	
PR-1	Environmental Review Process	Req	X		X				A preliminary submission document was submitted for this credit.
PR-2	Lifecycle Cost Analysis	Req		X	X				No documentation was available for this credit.
PR-3	Lifecycle Inventory	Req		X	X				No documentation was available for this credit.
PR-4	Quality Control Plan	Req	X		X				The Transit New Zealand Notice of Requirement indicates that this will be completed for the project. A draft QCP was also submitted.
PR-5	Noise Mitigation Plan	Req	X		X				An Operational Noise Mitigation Plan was submitted.
PR-6	Waste Management Plan	Req	X		X				A draft Waste Management Plan was submitted.
PR-7	Pollution Prevention Plan	Req		X	X				No documentation was available for this credit.
PR-8	Low-Impact Development	Req	X		X				The submitted Appendices indicate that LID was taken into account in the project design. This includes Hydrologic and Geotechnical Reports.
PR-9	Pavement Management System	Req	X		X				The Project Alliance Agreement Sections S5-18 and S5-19 indicate that there are pavement and bridge management systems in place that will be utilized on this project.
PR-10	Site Maintenance Plan	Req	X		X				The Project Alliance Agreement indicates that a site maintenance plan will be implemented on the project.
PR-11	Educational Outreach	Req		X	X				No documentation was available for this credit.
PR Max: 11					11	0	0	0	



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Environment & Water (EW)			Intent		Effort to Complete				Notes
No.	Title	Pts.	Yes	No	Low	Med	High	N/A	
EW-1	Environmental Management System	2		X		2			No documentation was available for this credit.
EW-2	Runoff Flow Control	1-3		X		2	1		Documentation indicates that stormwater treatment will occur, but did not show specifically how treatment will occur or to what extent. The drainage design would need to be submitted to earn this credit.
EW-3	Runoff Quality	1-3		X		2	1		Documentation indicates that stormwater treatment will occur, but did not show specifically how treatment will occur or to what extent. The drainage design would need to be submitted to earn this credit.
EW-4	Stormwater Cost Analysis	1		X	1				No documentation was available for this credit.
EW-5	Site Vegetation	1-3		X	3				The Transit New Zealand Notice of Requirement document indicates that some revegetation may be done using native species, but additional documentation would be required to confirm that ONLY native species, non-invasive species, and/or plantings not requiring irrigation were used.
EW-6	Habitat Restoration	3		X			3		No documentation was available for this credit.
EW-7	Ecological Connectivity	1-3		X			3		No documentation was available for this credit.
EW-8	Light Pollution	3	X		3				Cut sheet submitted of Kaos Lighting fixtures indicates that the project will try to minimize light pollution. Documentation showing that this meets Dark Sky Certification will need to be submitted to confirm these points.
EW Max: 21					7	6	8	0	



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Access & Equity (AE)			Intent		Effort to Complete				Notes
No.	Title	Pts.	Yes	No	Low	Med	High	N/A	
AE-1	Safety Audit	1-2	X		2				The Project Alliance Agreement section S5-17 indicates that safety audits will be completed before and after construction.
AE-2	Intelligent Transportation Systems	2-5		X		5			No documentation was available for this credit.
AE-3	Context Sensitive Solutions	5	X		5				A draft CSS document has been submitted.
AE-4	Traffic Emissions Reduction	5		X			5		No documentation was available for this credit.
AE-5	Pedestrian Access	1-2	X		2				The Draft Walking and Cycling Strategy document indicates that improvements for pedestrians and bicycles will be installed.
AE-6	Bicycle Access	1-2	X		2				The Draft Walking and Cycling Strategy document indicates that improvements for pedestrians and bicycles will be installed.
AE-7	Transit & HOV Access	1-5		X		3		2	The Notice of Requirements indicates that the new route may help local transit. Documentation did not show any specific transit installations that would confirm this credit could be achieved.
AE-8	Scenic Views	2		X			2		No documentation was available for this credit.
AE-9	Cultural Outreach	1-2		X	1		1		Many of the documents indicate that there may be culturally significant Iwi sites nearby, but it has not been indicated whether the project includes any installations to recognize this.
AE Max: 30					12	8	8	2	





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Construction Activities (CA)			Intent		Effort to Complete				Notes
No.	Title	Pts.	Yes	No	Low	Med	High	N/A	
CA-1	Quality Management System	2	X		2				ISO 9001:2008 certifications for both Opus and Fulton Hogan have been submitted.
CA-2	Environmental Training	1		X	1				No documentation was available for this credit.
CA-3	Site Recycling Plan	1	X		1				A draft Waste Management Plan was submitted, as well as documentation showing intent to recycle materials on the project. This WMP should include the recycled materials.
CA-4	Fossil Fuel Reduction	2		X			2		No documentation was available for this credit.
CA-5	Equipment Emission Reduction	2		X			2		No documentation was available for this credit.
CA-6	Paving Emission Reduction	1		X	1				No documentation was available for this credit.
CA-7	Water Use Tracking	2		X	2				No documentation was available for this credit.
CA-8	Contractor Warranty	3		X			3		No documentation was available for this credit.
CA Max: 14					7	0	7	0	



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Materials & Resources (MR)			Intent		Effort to Complete				Notes
No.	Title	Pts.	Yes	No	Low	Med	High	N/A	
MR-1	Lifecycle Assessment	2		X		2			No documentation was available for this credit.
MR-2	Pavement Reuse	1-5	X		1		4		Documentation was submitted indicating that at least 50% of the existing pavement structure will be re-used on the project. This would be sufficient to earn 1 point. Additional calculations should be completed to confirm that the re-use does not merit more points.
MR-3	Earthwork Balance	1		X			1		No documentation was available for this credit.
MR-4	Recycled Materials	1-5		X	2		3		Documentation was submitted indicated that pavement materials will be recycled on the project, but it is unknown what the recycled content of the newly placed pavement materials will be. It is possible the project is on track to achieve points, but additional documentation is required.
MR-5	Regional Materials	1-5		X	5				Documentation was submitted showing that some of the materials were sourced locally, but the documentation did not indicate what percentage of materials were local. Points may be easily achieved upon completing the calculation.
MR-6	Energy Efficiency	5		X		5			No documentation was available for this credit.
<b>MR Max: 23</b>					<b>8</b>	<b>7</b>	<b>8</b>	<b>0</b>	



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Pavement Technologies (PT)			Intent		Effort to Complete				Notes
No.	Title	Pts.	Yes	No	Low	Med	High	N/A	
PT-1	Long-Life Pavement	5		X		5			No documentation was available for this credit. It is possible that this credit could be achieved with the current pavement design. Proper calculations should be completed to see if the project merits these points.
PT-2	Permeable Pavement	3		X			3		No documentation was available for this credit.
PT-3	Warm Mix Asphalt	3		X		3			No documentation was available for this credit.
PT-4	Cool Pavement	5		X			5		No documentation was available for this credit.
PT-5	Quiet Pavement	2-3		X			3		No documentation was available for this credit.
PT-6	Pavement Performance Tracking	1		X			1		No documentation was available for this credit.
PT Max: 20					0	8	12	0	



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Custom Credit (CC)			Intent		Effort to Complete				Notes
No.	Title	Pts.	Yes	No	Low	Med	High	N/A	
CC-1		1-5							
CC-2		1-5							
CC Max: 10					0	0	0	0	